Vol. 8, No. 11 NOVEMBER, 1953

AGRICULTURAL CHEMICALS

In This Issue:

FERTILIZERS and INSECTICIDES go "hand-in-glove"

When fertilizer sales go "off" seasonally, insecticide sales go "on". Alert commercial fertilizer plant operators use these facts to keep their sales on an even keel the year 'round.

Use the same distribution channels you already have, the same plant, the same labor, the same overhead—and fill the fertilizer sales vacuum with increasing insecticide sales.

Other advantages:

- ***Build-up of your firm name***
- ***New approach for new customers***
- ***Safety of diversification***
- ***Increase dollar volume***

You have the plant, the sales staff and the customers. Powell has the tested products, the basic know-how, the time-proven quality—and the service to assure the best possibilities of success. Write for full information.

John Powell & Co., Inc.

ONE PARK AVENUE, NEW YORK 16, N. Y.

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KILLING POWER—THAT'S THE THING!

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PIPERONYL BUTOXIDE • ALLETHRIN • TEPP • PARATHION • ALDRIN • DILAN • HEPTACHLOR • 2, 4-D & 2, 4, 5-T.

LOOK TO POWELL...FOR CONSISTENT, TROUBLE-FREE QUALITY

It's Complete Coverage

The repeated application of high quality fertilizers permanently insures our crop and pasture lands.

Potash Company of America, producer of finest quality red muriate, is proud of its part in this soil insurance.

POTASH COMPANY of AMERICA
Carlsbad, New Mexico

General Sales Office ... 1625 Eye Street, N. W., Washington, D. C.
Midwestern Sales Office ... First National Bank Bldg., Peoria, Ill.
Southern Sales Office ... Candler Building, Atlanta, Ga.

Attaclay® delivers maximum flowability from formulation to field

OPERATION: Primary Processor's Plant on Gulf Coast.

PRODUCTION MANAGER: *Our product line contains nearly fifty dust base and wettable powder formulations utilizing solid and liquid toxicants. We've discovered that the best way to avoid the vexations of stickiness, heaviness and lumpiness, is to use Attaclay across the board. We depend on Attaclay to give us top output of dry, loose, premium-grade products.*

OPERATION: Finished Dust Blender's Plant in Mississippi.

OWNER: *First, we make every effort to start with Attaclay-mixed bases. Then we carry on from there by standardizing on Attaclay as diluent. As a result, we get fine end products that prove their own way to customer satisfaction by outstanding performance.*

OPERATION: Large-Scale Grower in Georgia.

FARM MANAGER: *One of our jobs is to analyze everything we use with a view to shaving unit costs and widening profit spread. That's why we know all about Attaclay—and why we're willing to pay a higher price for Attaclay-extended dusts. It is by far our cheapest way around many field application problems.*

ATTAPULGUS carriers for SOIL PESTICIDES

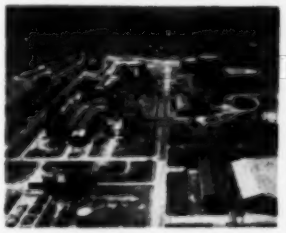
Granular grades have been developed which have formulating and field application characteristics of particular value in soil insect control. Like "thirsty" Attaclay, these commercially-proved granular grades have great sorptive capacity, insuring easy and effective processing. Excellent coverage results are obtained when applied either from the ground or the air. Particle size ranges to suit all formulations. Write for data sheet and free test samples.

Our suggestion: put Attaclay on your first team and forget flowability-dustability problems. May we work with you?

ATTAPULGUS Minerals & Chemicals Corporation

Dept. P, 210 West Washington Square, Phila. 5, Pa.

AGRICULTURAL CHEMICALS



This Month's Cover

Aerial view of Commercial Solvents Corporation plant located at Sterlington, Louisiana for production of anhydrous ammonia, methanol and nitric acid for fertilizer solutions. This plant is another illustration of the fertilizer industry's strides towards meeting plant food goals for the years ahead.

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Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

Spring top dressing of 8-8-8 helps increase wheat yield 25-35% for Julius Broerman, St. Marys, Ohio

This spring, Mr. Broerman applied 300 pounds per acre of 8-8-8 high-analysis fertilizer as a top dressing on wheat in a 19-acre field where corn and oats previously had been grown. This was in addition to a fall application of mixed fertilizer. His crop averaged better than 50 bushels to the acre—an increase of 25-35% over previous crops from the same field.

▶ Be sure your dealers will be supplied with good stocks of 8-8-8 and 10-10-10 for early spring sales! ◀

DEMAND for high nitrogen fertilizers is increasing all over the country as more men like Mr. Broerman actually see for themselves the increased yields that result from its use. Make certain that your dealers will have enough 8-8-8 and 10-10-10 on hand to be able to benefit from the early spring demand.

U·S·S Ammonium Sulphate can help you keep this demand on the increase by giving you top-quality nitrogen content in your complete fertilizers. Since U·S·S Ammonium Sulphate is a dry, free-running substance, it is easier to mix and easier to handle in distributing equipment. And it's thoroughly reliable in storage.

For complete information on U·S·S Ammonium Sulphate—either in bulk for mixing in your high-nitrogen fertilizers or bagged for direct application—contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Bigger yields for farmers mean better business for you

U·S·S AMMONIUM SULPHATE

USS

UNITED STATES STEEL

TENNESSEE CORPORATION

MINERAL SALTS

GIVE SUPERIOR RESULTS!

Healthy plant growth and optimum production of vitamin-rich crops are just as dependent upon minerals as they are nitrogen, phosphate and potash. Mineralized fertilizers stimulate sales and create new business because the results are conclusive. Fertilizers that give superior results are the fertilizers the growers will buy.

As basic producers of minerals, we would like to discuss mineralized fertilizer with you and show you how to increase your fertilizer tonnage and profits by the addition of minerals. We can supply mineral mixtures . . . mixed to your own specifications . . . in large or small quantities.

COPPER SULPHATE

☆

ZINC SULPHATE

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MANGANESE SULPHATE

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MAGNESIUM SULPHATE

☆

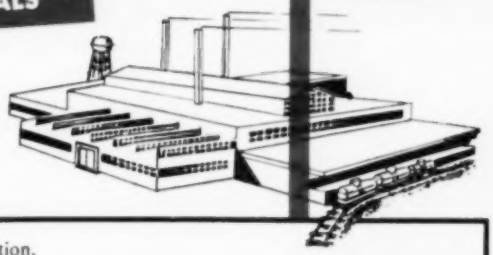
BORON

☆

FERRIC IRON SULPHATE

SOLUBLE TRACE MINERALS

Tennessee's trace minerals are soluble and their nutritional value is immediately available to the plant. Soluble trace minerals are more economical and faster acting.



For detailed information, phone, wire or write—

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

TC TENNESSEE CORPORATION

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TRI-BASIC TENNESSEE TRI-BASIC COPPER SULPHATE

TRI-BASIC Copper Sulphate is a chemically stable copper fungicide containing not less than 53% metallic copper. TRI-BASIC Copper Sulphate can be used as a spray or dust on practically all truck crops and citrus crops. Control persistent fungus diseases—correct copper deficiencies from a nutritional standpoint. Use TC TRI-BASIC Copper Sulphate.

TC TENNESSEE CORPORATION

COP-O-ZINC COP-O-ZINC NEUTRAL COPPER-ZINC

COP-O-ZINC is a new, neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives a superior performance in control of fungus diseases. COP-O-ZINK composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatible with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.

TC TENNESSEE CORPORATION

NU-Z NU-Z NUTRITIONAL ZINC

NU-Z contains 52% metallic zinc. It is a neutral zinc compound which does not require the addition of lime for direct foliage application. NU-Z gives excellent coverage and adherence to plant foliage, thus rendering it available over a longer period of time. Safe for direct application. For zinc deficiency and plant nutrition—use as spray or dust.

☆

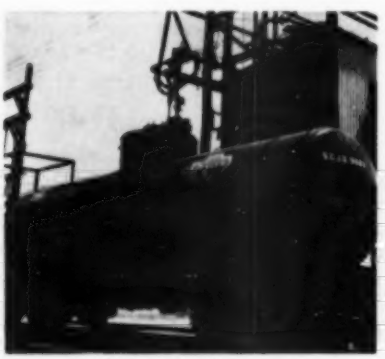
Farm Belt Executives are C. H. Fluty, general manager and Doyle Patterson, treasurer.

"The Belt That Holds Your Plants Up" is the famous slogan of Farm Belt Fertilizer and Chemical Company, Kansas City. Organized in 1948, this plant now produces granular as well as regular fertilizer; has 40,000 tons capacity. A victim of the flood of '51, the plant was back in operation within 90 days.

Farm Belt Fertilizer & Chemical Co.

...Another Spensol User

Specialized Equipment costing millions is essential in producing SPENSOL (Spencer Nitrogen Solutions).



Spencer Means Service, and dependable service has made SPENSOL the choice of leading mixers.

Let Spencer's Technical Service staff help solve those production problems. There's no charge for this service.

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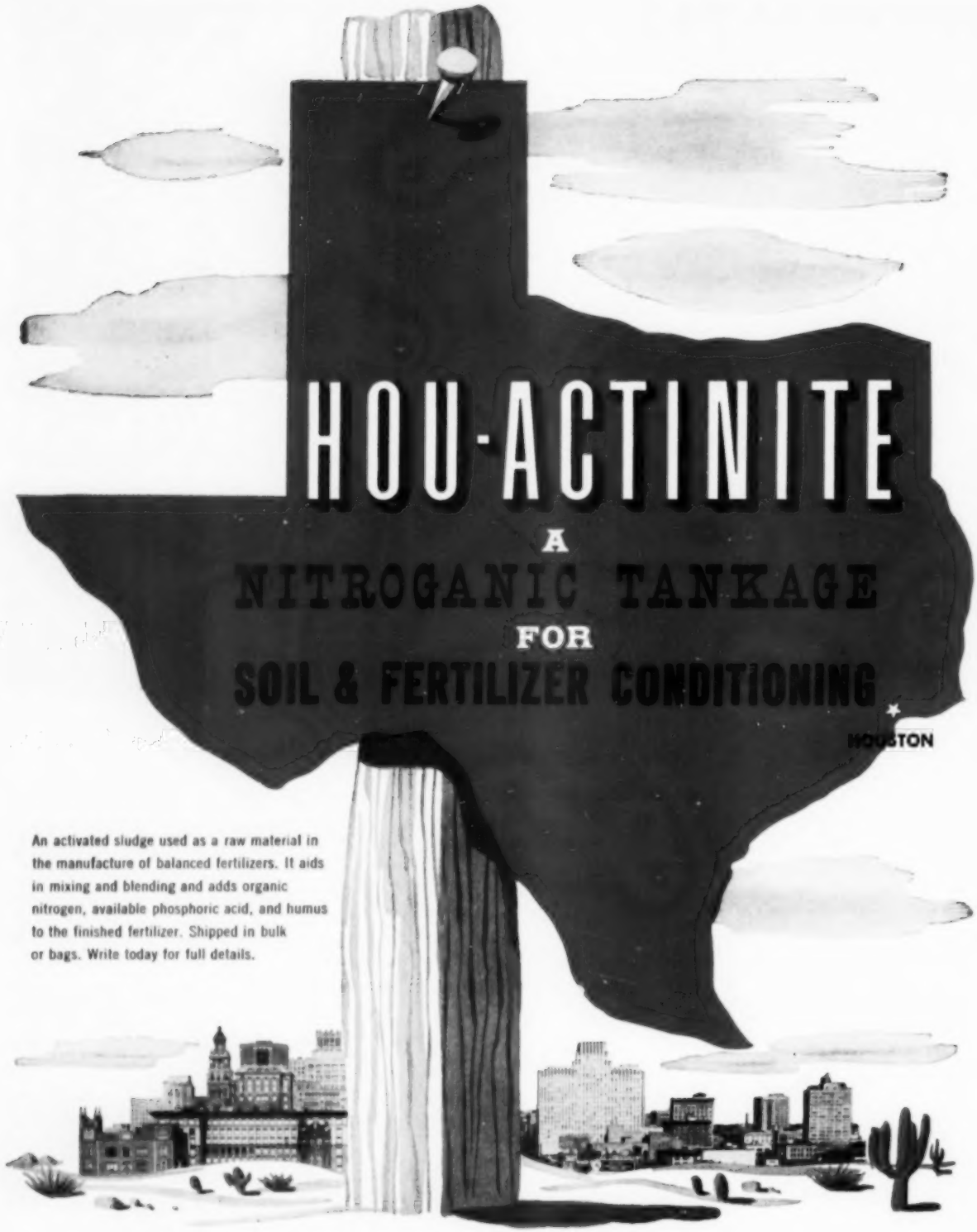
District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.;
Works: Pittsburg, Kans.; Henderson, Ky.; Chicago, Ill.; Vicksburg, Miss. (under construction)



An activated sludge used as a raw material in the manufacture of balanced fertilizers. It aids in mixing and blending and adds organic nitrogen, available phosphoric acid, and humus to the finished fertilizer. Shipped in bulk or bags. Write today for full details.

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BLENDED EMULSIFIERS

TOXIMUL
ADVANTAGES . . .

- Flash Dispersion
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- Excellent Storage Stability
- Low Costs

Spontaneous emulsification . . long storage life . . tight, slow-creaming emulsions in both soft and hard waters . . you get these and other superiorities in your pesticidal sprays with the TOXIMUL anionic-nonionic blends developed by Ninol Laboratories especially for these applications.

Whichever toxicants you prefer, you'll find that one of the Toximuls is tailor-made to give you consistently better formulations, which will mean more satisfied users of your products.

And you can get these improved results while actually cutting production costs — because the TOXIMULS are distinguished by an *unusually low price.*

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- ☐ *TOXIMUL* 300 (for use with DDT, Aldrin, 8 lb. Chlordane)
- ☐ *TOXIMUL* 400 (for use with BHC, Lindane, Dieldrin
- ☐ *TOXIMULS* (for use with other pesticides)

Signed _____

Co. _____

Street _____

City & State _____

Use less insecticide . . .
Get more effective control

DIAMOND 100% LINDANE

DIAMOND 100% LINDANE is *all* insecticide — that's why a little goes a long way. To illustrate both the economy and effectiveness of DIAMOND Lindane in seed treatment, for example, a single ounce per acre does a thorough job.

DIAMOND 100% LINDANE is just about the most useful insecticide farmers, gardeners, orchardists and stockmen could ask for. Highly effective in controlling many insects which destroy vegetable crops, fruits and berries, it is also a specific for certain parasitic insect pests which infest sheep, cattle, hogs, horses and poultry.

DIAMOND 100% LINDANE kills *three* ways—by contact, vapor and stomach action—and it *continues* to kill long after it is applied because of its exceptional residual action.

For detailed information on multi-purpose DIAMOND 100% LINDANE, write to:

DIAMOND ALKALI COMPANY

Organic Chemicals Division
80 Lister Avenue • Newark 5, New Jersey
Plants: Newark, N. J. and Houston, Texas

DIAMOND ALKALI CHEMICALS

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this manual tells how to fumigate more effectively

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You know the effectiveness of Methyl Bromide, finest chemical fumigant ever developed. Now you can get complete facts on every phase of its application for rodent, insect, and weed seed control.

Michigan Chemical Corporation, prime producer of Pestmaster Methyl Bromide in both cylinders and cans, offers an unusually detailed fumigation manual for your convenience. Whether your interest is in growing, storage, or processing of grain, fruit, meat, dairy products, tobacco, cotton, peanuts, or other foods, you'll find complete instructions and invaluable advice regarding your fumigation needs. Simply indicate your interest on the chart at right and mail today. Your particular manual will be on its way at once.

YOURS ON REQUEST—Unusually complete and explicit fumigation instructions in manual form. Step by step recommendations for a wide range of Methyl Bromide applications, including dosages, equipment and precautionary measures. Indicate the type of application of interest to you on chart below. Pestmaster manual will be sent at once. No obligation.

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- ☐ Packer
- ☐ Warehouser
- ☐ Processor
- ☐ Shipper
- ☐ Manufacturer

CHECK APPLICATIONS OF MOST INTEREST TO YOU

- ☐ Box Cars
- ☐ Cotton Storage
- ☐ Candy
- ☐ Dairy Plants
- ☐ Flour Mills
- ☐ Food Plants
- ☐ Grain Bins
- ☐ Grain Elevators
- ☐ Meat Packing Plants
- ☐ Nursery Soil
- ☐ Tobacco Seed Beds
- ☐ Vaults
- ☐ Warehouses
- ☐ Insect Control, general
- ☐ Rodent Control, general
- ☐ Pink Bollworm Control
- ☐ Other
- ☐ Have Representative Call

Send request to Dept. 10, Michigan Chemical Corp.

Name

Company Name

Company Address

City Zone State

MC

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To help progressive fertilizer producers capitalize on this opportunity of expanding their markets, Monsanto produces a basic line of soluble, easily compounded nutrients. These compounds have three important advantages for formulators:
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DIAMMONIUM PHOSPHATE (CRYSTALS) 21.0% 53.8% —0—
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PHOSPHORIC ACID (75.0%) (LIQUID) —0— 54.9% —0—
MONOPOTASSIUM PHOSPHATE (CRYSTALS) —0— 39.9% 33.0%
—0— 21.2% 21.2%
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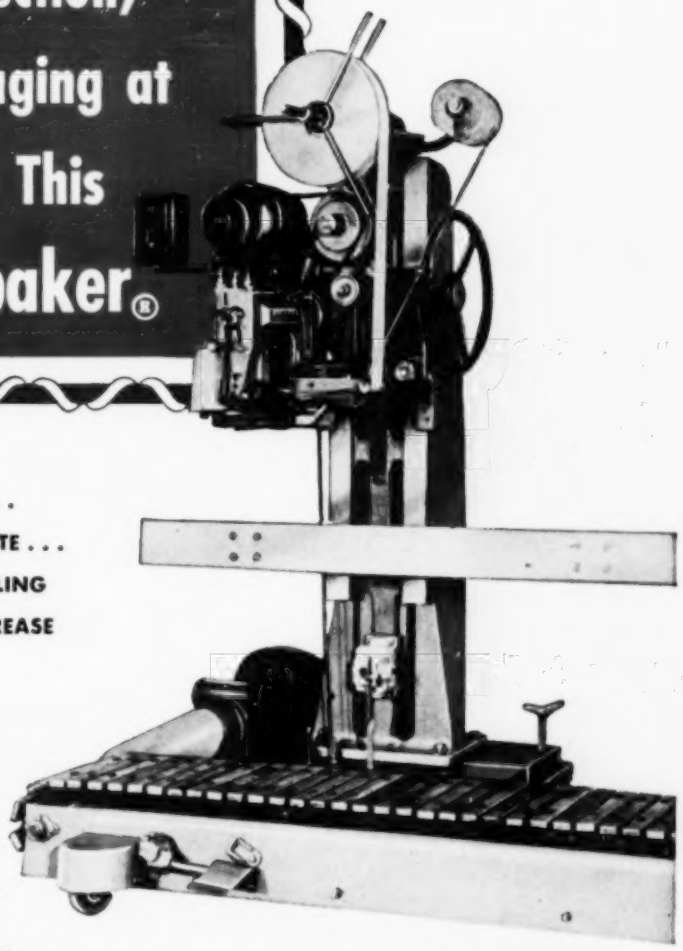

CLOSES OPEN-MOUTH, MULTIWALL PAPER BAGS SEMI-AUTOMATICALLY . . . TAPES AND SEWS 15 BAGS A MINUTE . . . TEAMS UP WITH YOUR EXISTING FILLING AND WEIGHING EQUIPMENT TO INCREASE PACKAGING EFFICIENCY

You don't have to scrap your present equipment to get *stronger*, more *economical* bag closures with this Model ET Bagpaker. One man—receiving bags from your existing weighing and filling set-up—applies creped "*kraft*" sealing tape over the bag end...sews a reinforced "cushion stitch" through both tape and bag ...and neatly trims tape...time 4 seconds or less. Dimensional drawings and detail information are available in Booklet ET -D-12 Write for your copy *today*. Bagpak Division, International Paper Company, 220 East 42nd St., New York 17, N. Y.

Model ET applies famous "Cushion-Stitch" over dry tape for sift-proof closure. Model E-1 applies "Cushion-Stitch" only, for use where sift-proofing is not essential.

Check These Model ET Bagpaker Advantages

- ★ 15 bags per minute with one operator when filled bags are continuously delivered to conveyor.
- ★ Quickly adjustable for bags of from 25 to 100 lb. capacity.
- ★ Completely portable. Mounted on casters, can be moved easily to various packaging stations.
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does both jobs efficiently at less cost!

Emulsifier 1869 is good news to compounders and formulators. It eliminates buying two or more emulsifiers for herbicide and pesticide operations because it does *both* jobs equally well. And it saves you money because performance tests have proved that Emulsifier 1869 can be used in smaller quantities to do the same job as other emulsifiers. No oil separation, and outstanding performance in hard water are other reasons why Emulsifier 1869 is perfect for both herbicides and pesticides.

Emulsifier 1869 is a combination of Armour's emulsifiers blended to give maximum emulsifying properties and both soft and hard water emulsion stability. It is soluble in aromatic, chlorinated and polar solvents, but insoluble in naphthas and kerosene. Although it was originally developed for Toxaphene, it has proved to be an excellent emulsifier for Chlordane, Lindane, DDT, and low volatile esters of both 2, 4-D (dichlorophenoxyacetic) and 2,4,5-T (trichlorophenoxyacetic) acid at concentrations of 2½-10%, depending upon the particular toxicant used.

Emulsifier 1869 may be added directly to the herbicide *without* use of solvent. Concentrations of 5-10% are recommended. It successfully emulsifies Isopropyl 2,4-D, Butoxyethanol ester of 2,4,5-T, Propylene glycol butyl ether ester of 2,4,5-T and Iso-octyl ester of 2,4,5-T.

Your own tests will convince you of the advantages of Emulsifier 1869. Send the coupon with your letterhead for a free sample.

MAIL THIS COUPON TODAY!

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Please send me:
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- ☐ Tech. Bull. E-4, Emulsifiers for Toxicants
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*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

To the farm boy there's no mystery about how seed is sown or a bumper crop harvested—the men and machines busy in the fields tell the story. But what happens between sowing and reaping? What makes the crop grow strong and healthy? How does seed become food for man and beast? The answer lies in the soil.

While man supplies labor and knowledge, it's the soil that supplies the strength responsible for the growth of all living things. For from the soil come the vital plant-food elements that nourish all life. And to the soil these elements must be returned.

Many of the most effective soil-replenishing fertilizers contain POTASH, often Sunshine State Potash, a product of New Mexico. For Potash nourishes the soil with active ingredients that make for bumper crops and larger profits. Potash is a valuable profit-producing aid.

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

REG. U. S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

Want a Greater Alfalfa Yield per acre?

BORON-HUNGRY ALFALFA...Dwarfed and puny, with yellow or reddened top leaves, stunted, with growing tips rosetted. When these symptoms appear, it's Nature's distress signal for a new supply of Boron.

TOP QUALITY ALFALFA...Fertilized with Boron, grows lush and strong...provides maximum yield with bigger profits. Vigorous growth, such as this, shades out weeds resulting in longer life stands.

Borated Fertilizers pay 3 ways on Alfalfa

1. **EXTRA YIELDS**—an extra ton of hay per acre.
2. **BETTER QUALITY**—hay that is extra-leafy and green.
3. **LONGER LIFE STANDS**—vigorous growth shades out weeds.

Yes, Boron means bigger crops of better quality! Alfalfa responds so readily to Boron that, in some cases, yield per acre is doubled. To put Boron back into the soil, use FERTILIZER BORATE—HIGH GRADE . . . it's the low-cost fertilizer borax, rich in Boron. (Contains approximately 121% borax equivalent).

FERTILIZER BORATE—HIGH GRADE, is an ore concentrate developed especially for fertilizer use. Because its water content is held to about 24% water (5 mols) this material saves money in costs of transportation, storage, handling, etc. Only 83 lbs. of FERTILIZER BORATE—HIGH GRADE is required for each 100 lbs. borax guaranteed in formulated mixtures. Available in two particle sizes; a fine mesh for adding to mixed fertilizers . . . a coarse mesh for direct application if required. County Agents or State Experimental Stations should be consulted for detailed recommendations.

Write today for literature and quotations on Fertilizer Borate—The Low-Cost Fertilizer Borax

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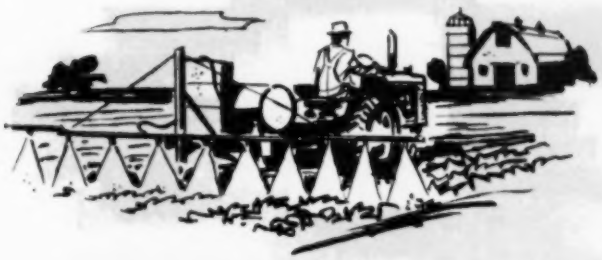
CHLORDANE versatility PROMOTES PROFITS

The wide *variety of uses* for Chlordane can be a positive help to you in broadening your profit picture. Chlordane's widespread applications mean greater volume—and greater earnings for you.



IN AGRICULTURE

For many years Chlordane has been producing profits for formulators and protecting profits for farmers throughout the nation. It controls wire worms on potatoes and tobacco, rootworms on corn and peanuts, alfalfa weevils and many more insect pests which attack farm crops. Yes, effective insect control with Chlordane *does* mean increased profits for America's farmers . . . and insecticide formulators.

FOR LAWNS AND TURF

Chlordane is the most outstanding insecticide on the market for the control of lawn and turf insects. It is widely used wherever control of such pests is necessary . . . on golf courses, in parks, by civic or private institutions, on home lawns. Chlordane controls ants, chiggers, white grubs, earwigs, chinch bugs, sod web worms or lawn moths, mole crickets and Japanese beetle larvae.

TERMITE CONTROL

Termite control is one of the biggest markets for Chlordane sales. Effective control . . . long residual . . . easy application . . . without any danger to trees, flowers, or shrubs in the treated area. These are Chlordane advantages that will produce profits for you.

HOUSEHOLD INSECTS

Chlordane is approved for the control of many household insects. It is in wide demand for eliminating ants, roaches, carpet beetles and other pests which invade the home. Chlordane is economical, effective, easy and safe to use at recommended dosages—that's why so many householders demand Chlordane insecticides.

Are you overlooking opportunities for Profits with Chlordane? Write Today To—

VELSICOL CORPORATION

Division of Arvey Corporation

General Offices and Laboratories
330 East Grand Avenue, Chicago 11, Illinois

Export Division
100 East 42nd Street, New York 17, New York

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LION

Nitrogen

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LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

TECHNICAL SERVICE—Lion provides special technical assistance for fertilizer manufacturers. Write to CHEMICAL SALES DIVISION for quick service.

LION OIL COMPANY

EL DORADO, ARKANSAS

Four Years of Testing Prove...

NEW S/V SOVASPRAY 100

SAFEST CARRIER For AGRICULTURAL CHEMICALS

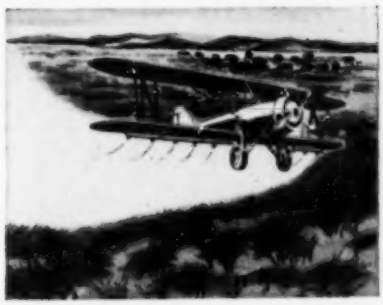
Tested during the past four years by more than 50 federal and state experimental stations and commercial laboratories, *S/V Sovaspray 100* has been *proved the safest carrier* yet developed for oil-soluble chemical insecticides and fungicides, and for plant nutrients and hormones.

Pictured are some of the varied applications in which S/V Sovaspray 100 has been found superior. For complete details on how it can improve the effectiveness and sales potential of *your* products call in your Socony-Vacuum representative.

SOCONY-VACUUM OIL CO., INC., 26 Broadway, New York 4, N. Y., and Affiliates:
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

SOCONY-VACUUM
process products

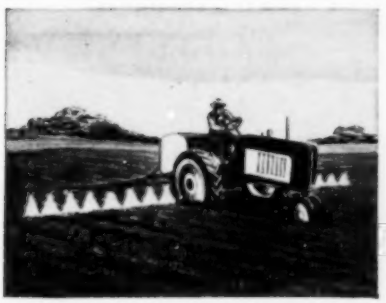
Process Products



HERBICIDES. Penetrating power of S/V Sovaspray 100 takes specific herbicides, like 2, 4, 5-T deep into plants, without burning tissue or halting translocation in normal usage.

FUNGICIDES. For *undiluted* use, S/V Sovaspray 100 sticks to plants, spreads chemical fungicides 25 to 50 times better than other hydrocarbon oils—yet won't burn foliage.

DEFOLIANTS. With S/V Sovaspray 100, defoliating chemicals can now be carried into the plant circulation system by a vehicle that does not injure the plant itself.



INSECTICIDES. Used with insecticides, New S/V Sovaspray 100 has proved to be an ideal safener for aromatic solvents and oils in crop and shade tree applications.

SYSTEMIC PESTICIDES. The spreading and penetrating properties of S/V Sovaspray 100 effectively introduce these new insecticides and fungicides into plant circulation systems.

NUTRIENTS. Plant foods, hormones and trace elements can all be applied safely to many types of plants through the foliage, when S/V Sovaspray 100 is used as carrier.

- The outstanding nitrogen fertilizer compound
- Supplies essential plant food economically

CAL-NITRO

TRADE MARK REG. U.S.PAT. OFF.

- Contains 20.5% Nitrogen and at least 20% Calcium Oxide equivalent
- In free-flowing, fast-acting, long-lasting form

Cal-Nitro is packed in 100 lb. bags

SYNTHETIC NITROGEN PRODUCTS CORPORATION
285 MADISON AVENUE, NEW YORK 17, N. Y.

Fertilizer - the Key to Maintaining Farm Profits

by

Dr. Russell Coleman

President, The National Fertilizer Association
Washington, D. C.

THE American farmer today occupies a position similar to that of American industry. His capital investment, like industry's, has risen sharply. He has over three times as much invested in his farm plant as he had in 1940. As is the case with industry, the farmer cannot permit his farm plant to lie idle without going bankrupt. He must keep it producing, and he must continue to make a profit.

During this period of declining prices for agricultural products, the farmer's most effective weapon for combating the cost-price squeeze is increased efficiency—cutting production costs as much as possible. This is virtually the only remedy that an individual farmer can himself apply.

There are many ways that farmers can cut production costs. Use of the newer, more efficient labor-saving machines; constant attention to preventing losses from insects, plant diseases, weeds, rodents, etc.; careful selection of seeds best adapted to conditions on his own farm; adoption of improved cultural practices; and vigilant attention to maintenance and repair of his farm plant are a few of the more important.

But perhaps the one tool available to the farmer which promises a greater potential cost-saving than any other is more effective use of fertilizer!

It has been estimated that American farmers this year could have cut two billion dollars from their production costs had fertilizer been used universally in accordance with recommendations of the State Agricultural Experiment Stations. This two billion dollars in savings, above the cost of the additional fertilizer, would have boosted net farm income this year from an estimated $12.5 billion to nearly $15 billion. Instead of a one billion-dollar, or 7 percent, drop from 1952, net farm income would have been *increased* by that amount, despite a decline of 11 percent from 1952 in prices received for farm products. In the case of the corn crop alone, farmers could have produced the same total number of bushels on 20 percent fewer acres at an estimated net savings of one-half billion dollars.

It is claimed by some that more effective use of more fertilizer will only add to the surplus problem by increasing total output when less is needed. This is not true. By using fertilizer properly, farmers can realize a *larger profit* from a *smaller total output* be-

(*Turn to Page* 109)

For best mechanical condition of fertilizer mixtures

...AERO® CYANAMID

For over 40 years, AERO Cyanamid has helped many leading fertilizer manufacturers to solve production problems. AERO Cyanamid has not only earned the reputation of being "the best conditioner known"... it has proved to be one of the best ways of meeting the demand for higher percentages of nitrogen and potash in mixed fertilizers.

Cyanamid's technical service staff and research laboratory are at your disposal for consultation. If you have special operating or formulating problems, we will be glad to give you information and technical assistance.

First three piles of mixtures (left to right) contain AERO Cyanamid. They are free-flowing and in good mechanical condition. Solid caked pile at extreme right contains no Cyanamid. It will have to be reground and re-bagged before being usable.

Write for either of these free booklets

For Eastern use...

Complete information on how to use AERO Cyanamid to improve quality and mechanical condition of fertilizer mixtures: General procedures in formulating fertilizers for curing in a pile... for mixing directly to the bag. Formulating fertilizer mixtures. Operating suggestions. Formulation with ammoniated bases. Reducing moisture in fertilizer mixtures. Formulating neutral fertilizers. Sample formulas.

For West Coast use...

Complete information on the properties and uses of AERO Cyanamid in fertilizer mixtures in the West: General procedures for composting materials in a pile ... for mixing directly to the bag. Use of Cyanamid with ammonium phosphate. Formulating All-Cyanamid-Nitrogen (ACN) mixtures. Handling AERO Cyanamid in fertilizer plants. Sample formulas.

Free chart for calculating fertilizer formulas available on request.

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AGRICULTURAL CHEMICALS DIVISION

30 Rockefeller Plaza, New York 20, N. Y.

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AERO® Cyanamid: Defoliants—Herbicides
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CYANOGAS® Calcium Cyanide Fumigants
HCN Fumigants
ACRYLON® Spot Fumigant
POTASSIUM CYANATE Weedkiller for Agriculture and Turf
AEROTIL® Soil Conditioners

*Trade-mark †also known as MALATHION

Editorial COMMENTS

MEMBERS of the fertilizer industry will find interesting reading in perusing the answers received by AGRICULTURAL CHEMICALS in reply to a recent questionnaire sent out to the trade in many portions of the country.

Although the outlook naturally differs rather widely between individuals and among people in different geographical areas, still there is an underlying theme in practically all the comments received to date. In most cases, tonnage is over that of last season. Most letters reported better sales last spring than are being experienced this fall, however. This is understandable in view of widespread lack of rain and uncertainties regarding acreage allotments, Governmental support and farm income trends. Most fertilizer users have adopted a "wait and see" attitude and their reluctance to buy of late is not regarded as a final decision to cut down on fertilizer use.

Out of all the comments we have received, the central idea, recognized by nearly all our writers, is that the industry is facing a period where it has to get right out and sell! As well expressed by one middle western manufacturer, "There is a real challenge ahead in the marketing of fertilizers. It will require intelligent and aggressive selling. The agricultural colleges are doing a splendid job in selling the economics of fertilizers to the farmers, but the fertilizer industry itself also has to remain aggressive."

The writer adds that his company encourages growers to establish check plots so that they can prove to themselves the value of more plant food per acre. Many additional tons of plant food can be sold through this method, which is, after all, the most convincing kind of salesmanship.

Many reliable signs point to a long-time need for increasing amounts of fertilizers. The need for food in the U. S. and the world is not likely to let up appreciably over the long pull despite present surpluses in many commodities. The farmer simply can't afford to "economize" on the amounts of plant food he uses.

The job of the industry, as we see it, is to let more farmers know about the very favorable economics of increased use of fertilizer, and to continue to drive home these facts. Great strides have been taken in this direction already by the National Fertilizer Association and we should like to see the idea catch on at all levels of fertilizer selling.

IN KEEPING with a trend toward simplification of terminology in the rather complicated agricultural chemical field, the executive committee of the Association of Economic Poisons Control Officials has recommended that the organization's name be changed to "Association of Pesticide Control Officials". We feel that this is a forward step from a public relations point of view, since the old designation, "Economic Poisons" lent itself to misunderstanding in the public's mind. "What are 'economic poisons'" is a question asked frequently. Practically everyone knows what a "pesticide" is.

Somehow the word "poison" has a tendency to scare people . . . and there have been instances where writers and others have made the most of this fact to associate economic poisons with illness and death. We are happy, then, to see this good, but misunderstood, word disappearing from trade terminology.

An Industry Observer Reviews Pros and Cons concerning use of

Surfactants in Fertilizer

NEWS about the beneficial effects of surface-wetting agents in quick-curing fertilizers and improving condition which broke on the commercial fertilizer world about a year ago, sent plant superintendents and others in the industry scurrying to the dictionary to look up that new mongrel word, "Surfactant." If the announcements were true, this could be the unexpected answer to their prayer! For years, particularly since the introduction of hygroscopic high-analysis nitrogen carriers, the industry has been struggling with the problems of staying or preventing the caking of bagged fertilizers put in storage, and the speeding up of the rate of curing. Indeed, the caking tendency may be exhibited by some formulations soon after manufacture. Now, so the news releases said, by introducing a tiny amount of a chemical called "surfactant" into the mixing drum — one pound per ton — it was possible to overcome the tendency to form hard lumps, and cut down the curing period from 30 days to 3 days. What person having the job of making fertilizers, would not have welcomed such good news? It was a consummation devoutly to be wished. But, alas, like other dramatically announced new chemical discoveries of recent years, performance failed to measure up entirely to the promise. Time, scientific investigation and patience will undoubtedly determine the role which wetting agents can play in the production of improved chemical fertilizers. Some evidence exists that under certain conditions they can be beneficial.

To review some of the experiences of the fertilizer industry with wetting agents since their first announcement is the purpose of this paper.

What are Surfactants?

FOR the benefit of the non-technical person, it may be advisable to describe a surfactant. Surfactants, or surface wetting agents, are chemical compounds which can lower the surface tension of a liquid and thereby make it "wetter" and able to penetrate a surface or mix more thoroughly and quicker with other chemicals. For the layman to understand this concept, he should know that all liquids have a certain surface tension which forms at the surface between the liquid and air. Most everyone has seen water bugs gliding over the surface of water without breaking the surface film. This film can be looked upon as a skin forming between the surface of the water and the air.

A wetting agent is peculiar in this way: one portion of it is composed of substance that has an affinity for water, and the other portion is repelled by water. When such an agent is dissolved in water it rises to the surface like fat globules in milk, and the portion which is attracted to the water remains submerged, while the portion repelled by the water breaks through the surface. Since the chemical is composed of millions of tiny molecules, it is not hard to visualize how the surface film of the water thus pierced by millions of molecules, suffers a lowering of its tension. The net effect is to make it possible then for the water to intermix more intimately with other liquids or to penetrate more effectively the tiny pore spaces of solids or powders.

The chemist has classified wetting agents into two categories which he calls "ionic" and "non-ionic." The ionic wetting agents split up into ions when dissolved in a liquid, each ion carrying either a positive or negative electrical charge, referred to as cationic and anionic, respectively. The non-ionic group dissolves in water without splitting up into negative and positive fragments or ions. The types of chief interest to the fertilizer industry are the anionic and non-ionic.

The concept of making water "wetter" is hard to grasp through definition. Perhaps an illustration is the best way to describe this property.

*Paper given at Meeting of American Fertilizer Control Officials, October 16, 1953, at Washington, D. C.

by
Vincent Sauchelli
Director of Agricultural Research
Davison Chemical Corp.,
Baltimore, Md.

Oil and water will not mix. Dissolving one of these wetting agents in the water, will cause it to mix with the oil. Water sprinkled on a duck's back will form droplets and roll off; but that same water plus an appropriate wetting agent will penetrate the oily surface of the feathers and actually wet them through and through. The new soap powders used in the home in place of soap are provided with a surfactant, or detergent.

Many Claims Made

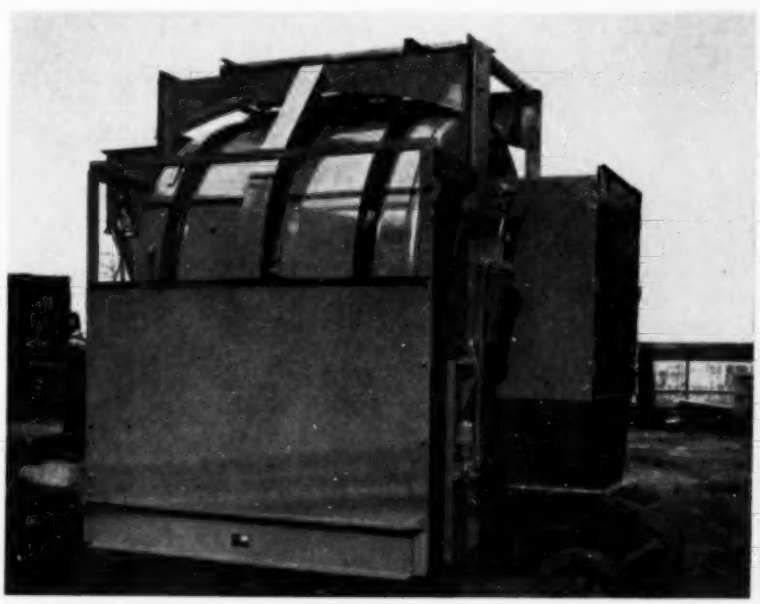
TYPICAL of the claims made for surfactants by suppliers are the following:

Quick cure for fertilizers, reducing the curing phase from 30 days to 3 days, or to 1/10th of normal period, which will tie up considerably less space required for curing in the bin, increase turnover of materials, and level out production while speeding up service to farmer, especially during peak production periods.

Less water required during ammoniation of mixture of fertilizer materials, hence less energy required to dry final product. More complete penetration by the water and dissolved ammonia plus other plant foods into the solids during mixing phase, causing quicker and more complete chemical reactions in the mixer.

A surfactant is to be considered a valuable aid in processing and not a "conditioner" in the sense tobacco stems or similar inert materials are used in the industry: such materials physically keep the solid chemical particles from making direct contact with each other; surfactants act chemically to promote rapid curing and other beneficial effects. For example, moisture in an ordinary fertilizer collects on the surface of the component particles where its solvent action results in a concentrated solution of the soluble chemicals present; as the temperature gradient drops the solution cools off and in so-doing, causes the dissolved materials to "salt" out in the form of crystals which bind and knit the solid particles surrounding them to form a hard set.

The effect of the wetting agent



Right: Type of fertilizer mixer in which wetting agents may be added during process. Surfactants are not to be regarded as "conditioners"; but rather, as acting chemically to promote rapid curing and more favorable physical properties.

Less water required during ammoniation or mixing, more complete penetration by water and quicker and more complete chemical reactions in the mixer are benefits claimed to result from use of surfactants.

is to induce such surface moisture to penetrate below the surface so that the surface "salting" out phase with the consequent crystal bonding is prevented.

That the claims for surfactants were closely identified with some of the acute problems causing the major headaches of the production manager is one reason why such wide interest was created in them. The claims indirectly define the important problems facing the manufacturer.

What is the Record?

AN industry round-table discussion on the use and present status of surface wetting agents in fertilizer manufacture was held in Chicago September 8-9, 1953. To this discussion were invited men from numerous fertilizer companies who had had actual experience in the utilization of surfactants in the manufacture of superphosphate and of mixed fertilizers, representatives of the major producers of surfactants and a group of research men. What follows is more or less a brief summary of the statements made by the fertilizer men who participated in the review of experiences. The statements will be identified only by the name of the State where the tests were made.

Florida

SOME surfactants seemed to improve physical condition of superphosphate, others do not. Apparently it may be possible in time to find right type of surfactant for superphosphate manufacture that will improve physical condition to the extent that the overall operation is improved. However, surfactant will not cure poor operating conditions. It was observed that the available P_2O_5 was increased at den stage in treated super, but this tends to level off after two weeks when compared with conversion rate of non-treated super. Tests showed that the surfactant reduced caking in ammoniated mixed fertilizers.

Maryland

THE surfactants tested had only moderate beneficial effects on the condition of superphosphate and mixed fertilizers. Non-ionic surfactants appear to be more effective type, but further studies are indicated and warranted. It has been suggested that the objective of proposed studies be the improvement of physical condition of mixed fertilizers, high-analysis grades. The factors that should be closely studied under controlled conditions should be: (a) formulation, influence of surfactants, both ionic and non-ionic on homogeneity and caking; (b) influence on increased rates of ammoniation; (c) influence on mixing.

Up to the present time, no conclusive evidence has been found that surfactants are beneficial in reducing time and efficiency of normal chemical reactions whether in acidulation of rock phosphate or in production of mixed fertilizers.

Another report from Maryland indicates that inclusion of wetting agents in the acidulation of phosphate rock has not shown any advantage. Use of non-ionic surfactants in the production of non-granulated mixed fertilizers has given variable results, some being favorable, others not.

Pennsylvania

TEST runs were made with quantities of 75 tons and more, in which 5 different commercial, non-ionic surfactants were used in comparison with similar tests without surfactant. One surfactant was used throughout the entire season on all production; that is, on all normal grades. Other surfactants were used in test lots of high analysis fertilizers only.

In all cases, the only apparent difference between the treated and untreated lots was a delay in set among the treated lots ranging from 24 to 72 hours. The final pile set, however, was no different from that experienced ordinarily.

Mixed fertilizers with surfactant tests: Those bagged after bin storage of from several days to 8 weeks and stored in routine manner from several days to four months, showed no difference from the non-treated controls which were put through same routine.

Laboratory studies: (Tested effect, if any, of numerous surfactants in the ammoniation of triple superphosphate). Results showed no significant effect on retention of ammonia; that is, the amount absorbed by the super was not increased. Apparently, from these general studies, surfactants have not improved physical condition nor have they worsened it.

"We shall discontinue use of surfactant as routine use for improving condition, but shall continue our plant scale studies to determine their influence as anti-fouling agents in plant equipment and laboratory studies on their effect in the ammoniation of triple", the paper said. It added that surfactants will probably find a proper place in fertilizer technology.

Ontario, Canada

INVESTIGATIONS of surfactants were conducted here on a plant scale with lots ranging from 70 to 1000 tons. The rate of surfactant varied from 1 to 2 pounds, using two kinds of anionic wetting agents in plant-scale tests and other types in laboratory tests.

Results: Wetting agents did not reduce the length of curing period; treated mixed fertilizers in bags caked as readily as untreated, although in many cases, lumps of treated goods were softer; but caking continued and lumps did not disintegrate completely after bags had been tumbled around. Surfactants did not reduce the amount of ammonia gas leakage from the ammoniator.

Conclusion: No significant benefit was noted from surfactants; reduction of hardness in lumps was neither consistent nor reproducible either in the bagged goods nor in the curing pile. Routine use of surfactant was not considered justifiable considering cost versus benefits.

Further studies should be continued. It must be remembered that perhaps equivalent benefits may accrue through improvements in the system of mixing and curing.

Still another report from Maryland stated that studies showed surfactants caused some apparent reduction of caking in some, not all, formulations after bagging; but the

(*Turn to Page* 143)

Control Officials Meet

FOUR groups of agricultural chemical control officials held annual conventions at the Shoreham Hotel, Washington, D. C., during the week of October 12.

These included the Association of Official Agricultural Chemists; the Association of American Feed Control Officials; the Association of American Fertilizer Control Officials; and the Association of Economic Poisons Control Officials.

Leading off on October 12, the A.O.A.C. elected as president, Dr. E. L. Griffin, U. S. Department of Agriculture Washington, D. C. Other officers named were: Dr. Wm. F. Reindollar, College Station, Md., vice-president; and Dr. Wm. F. Horwitz, Food & Drug Adm., Washington, D. C., secretary-treasurer.

The Feed Control Officials elected Dr. Stacy B. Randle, Rutgers University, New Brunswick, N. J., as president; and John L. Monaghan, Topeka, Kansas, vice-president.

THE fertilizer officials elected H. A. Davis, Durham, New Hampshire, as president to succeed Parks A. Yeats, Oklahoma City, Oklahoma. Succeeding Mr. Davis as vice-president is R. W. Ludwick, State College, New Mexico. Dr. Bruce D. Cloaninger, Clemson, South Carolina, will remain as secretary-treasurer of the group. Named to the executive committee was F. W. Quackenbush, Lafayette, Indiana; and J. D. Patterson, Salem, Oregon. The latter two succeed Mr. Ludwick and G. W. Michael, Ottawa, Ontario, Canada, whose terms expired in 1953. Other members of the executive committee include H. R. Allen, Lexington, Kentucky and M. P. Etheredge, State College, Mississippi. The retiring president also becomes a member ex-officio and the other officers of the Association are also members of the executive committee.

Following the annual report of Dr. Cloaninger, president Yeats presented his address to the group, reviewing some of the progress made in the industry over the past nearly 100 years and sighting a number of significant events which have occurred along the way. He mentioned the first state fertilizer law which was passed in Massachusetts in 1856; the first fertilizer test plots in the United States at the Pennsylvania Agricultural Experiment Station in 1872; discovery of the Florida phosphate deposits in 1881; and ten years later the first production of concentrated superphosphate in the United States in Baltimore.

In the Photos

Above: Dr. Parks Yeats, retiring president, A.A.F.C.O.; Dr. Bruce D. Cloaninger, secretary-treasurer; and Dr. Henry R. Davis, newly-elected president during meeting.

Officers and executive committee, fertilizer group: (standing): F. W. Quackenbush, Lafayette, Ind.; J. D. Patterson, Salem, Oregon; H. R. Allen, Lexington, Ky.; and M. P. Etheredge, State College, Miss. (Seated): Dr. Cloaninger, Dr. Davis, R. W. Ludwick, newly-elected vice-president, and Dr. Yeates.

Below: Dr. H. B. Mann, president, American Potash Institute, Washington, D. C.; W. R. Allstetter, vice-pres., The National Fertilizer Assoc., Washington, D. C.; Stacy B. Randle, Rutgers University, newly-elected president, Feed Control Officials; and Dr. Edwin C. Kapusta, NFA, Washington, D. C. Dr. J. H. Cochran, head, Entomology Department, Clemson College, S.C. and Mort Leonard, Julius Hyman Div., Shell Chemical Corp., Denver, Colo. (right): Speakers on Fertilizer Control Officials' program: Dr. J. O. Hardesty; Dr. J. B. Hester; Dr. E. A. Epps; Dr. Aaron Baxter; Dr. Vincent Sauchelli; Paul T. Truitt; and Dr. P. A. Yeats. Dr. Russell Coleman, also a speaker, was absent when picture was taken.

Continuing his list of important events, Dr. Yeats mentioned the year 1893 in which ammonium sulphate was first produced as a by-product in the United States. In 1916, he recalled, the first American potash was produced commercially in California and six years later marked America's first commercial production of synthetic ammonia. Also included in Dr. Yeats' list was the first commercial shipment of potash from Carlsbad, New Mexico, in 1931 and the first experiments with the use of anhydrous ammonia directly applied to the soil, in 1939.

He pointed out that the upward trend in total population and a downward trend in the ratio of farm population calls for maximum efficiency in agricultural production. "The proper use of the right fertilizer is one way to help bring about this maximum efficiency," he said. Many states and areas are currently using only a relatively small proportion of their potential fertilizer needs. With this sort of a potential, Dr. Yeats indicated that all signs point to a continued upward trend in fertilizer consumption.

Control Laws Necessary

REGARDING the role of the fertilizer control official, the AAFCO president pointed out that fertilizer control laws are necessary and that they have been an aid not only to the industry but also to the farmer and agriculture in general. He said that the work of the control official has increased to some proportion at least with the development of the industry in a more or less parallel manner.

In summarizing the objectives of the Fertilizer Control Officials Association, Dr. Yeats indicated that the primary objective is to promote uniformity in all phases of fertilizer law inforcement. The organization exists for more reasons than this however, he said.

Dr. Yeats offered two suggestions to the control officials to help in gaining more efficiency. First of all, he said, there is great need for

Photos this page:

Top, left to right: J. R. Romaine, Potash Institute, Washington, D. C.; Paul T. Truitt; John R. ("Dugan") Taylor, Jr., Grand River Chemical Co., Tulsa, Okla.; and G. W. Michael, Ottawa, Ont., Canada.

Second shot: Dr. Russell Coleman, president, The National Fertilizer Association, Washington, D. C.; W. A. Minor, Assistant to the Secretary of Agriculture, Washington, D. C.; Mr. Truitt; and W. R. Allstetter, NFA vice-president, Washington, D. C.

Lower picture: Dr. Yeats holds engraved plaque presented to him as outgoing president of Fertilizer Control Officials. At right is Dr. J. F. Fudge, College Station, Texas, last year's A.A.F.C.O. president. (Lower photo by Louis H. Wilson, American Plant Food Council, Washington, D. C.)

uniformity throughout the country. He urged all of the control officials present to work toward the end of revising existing laws in their states, if these laws require such revision. "To be sure it can't be done overnight", he said, "but with our eyes on this goal much can be accomplished within the next few years."

He stated that the Model Fertilizer Bill committee of the Association with the help of industry has come up with a law which has been adopted by the Association and which he urged should be used as a pattern in future legislative matters. He pointed out that in recent years, exorbitant claims made by manufacturers and distributors of certain specialties such as liquid fertilizers, mineral additives, and various types of soil conditioners have made it necessary to revise much of the Model Fertilizer Bill to cover these and other items. It was stated that although the law would not be necessarily appropriate for all conditions in every state, its principles could still be followed in an effort to revise existing state laws in line with the uniform code.

The second suggestion had to do with furnishing fertilizer tonnage data either quarterly or semi-annually. He said that only eighteen states returning questionnaires furnish this type of tonnage data while the balance furnish it only annually or not at all.

The president warned his association members to guard against being only collectors and analyzers of samples. In addition to these duties, he said, the official can serve agriculture to the fullest by being willing to collaborate with other agencies to promote more efficient use of fertilizer.

In closing, Dr. Yeats recommended that the control officials maintain an attitude of both tolerance and open-mindedness. There are many problems ahead facing control officials in every part of the country including that of possibly changing fertilizer guarantees to an elemental basis. Committees from a number of interested groups have already met and

(*Turn to Page* 122A)

Economic Poisons Control Officials Meet

DURING an all day meeting on Saturday, October 17th, the Association of Economic Poisons Control Officials held its seventh annual convention. Dr. Floyd Roberts, Bismarck, North Dakota, was elected president of the Association to succeed Rodney C. Berry, Richmond, Virginia. Dr. Albert B. Heagy, College Park, Maryland, will continue as secretary-treasurer of the group. Succeeding Dr. Roberts as vice-president is Ernest A. Epps, Jr., Baton Rouge, Louisiana. Following the annual report of the secretary-treasurer, president Berry presented his annual address. He pointed out many of the advancements of the past year along legislative lines, expressing satisfaction with the trend toward uniform legislation in many of the states.

He explained the function of

(*Turn to Page* 122C)

In the Photos:

Top row: Dr. A. B. Heagy, secretary and Rodney C. Berry, outgoing president, Association of Economic Poisons Control Officials, listen to talk by Dr. Floyd Roberts, Bismarck, N. D., new president.

Second row: Dr. Allen B. Lemmon, Sacramento, Calif., and J. B. Patterson. Dr. A. H. Moseman, chief, Bureau of plant Industry, Soils and Agricultural Engineering, U.S.D.A., Beltsville, Md. and Dr. R. Q. Parks, Grace Chemical Corp., Memphis, Tenn.

Lower row: Thomas R. Cox, American Cyanamid Co., New York; Frank Boyd, V-C Corp., Montgomery, Ala.; Dr. Aaron Baxter; H. S. Klosky, Baugh Fertilizer Co. Baltimore, Md.; and H. C. Doellinger, O. M. Scott Co., Marysville, Ohio.

Agricultural Chemicals in small packages prove profitable to trade and develop the

Home Garden Market

THE "home garden" market for agricultural chemicals is one that has attracted increasing attention among manufacturers of pesticides, fertilizers, herbicides, soil conditioners, etc., over recent years. A great many new type products have beeen introduced to this market over the past few years, and a substantially increased volume of sales has developed. This home garden market for agricultural chemicals probably owes a substantial share of its increased business volume, and increased buyer interest, to the growing trend toward outdoor living and the general migration of new home owners toward the suburbs. The extra leisure created by the shorter work week, longer vacations and widespread adoption of daylight saving time have given people more time to work in and around their homes and gardens. The higher cost of many other activities, has made the relatively inexpensive and often actually productive hobby of home gardening of growing interest to more folks. Hence the growing market for chemical aids to the home gardener.

Many manufacturers of agricultural chemicals too have expanded their activities in the home garden market as a more profitable supplement to the bulk sale of chemicals to the commercial farm trade, the latter at prices which have been, to say the least, relatively unproductive over the past two seasons. They have sought to develop a higher profit and more dependable market for brand-named specialty items to ensure at least some earnings even during seasons like 1953 when the big commercial market for agricultural chemicals is in so many cases writing its bookkeeping entries in red ink.

Numerous new lines have made their appearance over the past year or two, and the introduction of new herbicides, soil conditioners, liquid fertilizers, and the like, has given many companies the urge, and the new product, with which to test out sales possibilities in the home garden field. However, by and large, the big sales volume still goes to the companies which have pioneered the market and whose packages and trade marks have been familiar on garden and seed store shelves for years. Among those companies which market a full line of such specialties on

Photos. pages 38 & 39

Across bottom of the spread are some of the numerous small-packaged products made and marketed by E. I. duPont de Nemours & Co., Inc., Wilmington, Del., illustrative of the wide range of products and the variety of package types common in this field.

At right the home garden kit marketed by Al-Kem Labs, Inc., Yonkers, N. Y. Included are measured quantities of seven different insecticides and fungicides which allow the user to do his own prescribing and formulating.

a coast-to-coast basis are E. I. du-Pont de Nemours & Co., Wilmington, California Spray-Chemical Corp., Richmond, Calif., Niagara Chem. Div., Food Machinery & Chem. Corp., Middleport, N. Y., Sherwin-Williams Co., Cleveland, and others.

Other firms prominently identified with the field, some selling locally and some nationally, some a single item and some a general line, include: Nott Mfg. Co., Mt. Vernon, N. Y.; Andrew Wilson, Springfield, N. J.; Doggett-Pfeil, Springfield, N. J.; B. G. Pratt Co., Hackensack, N. J.; U. S. Rubber Co., Naugatuck, Conn.; Cedar Hill Formulae, New Britain, Conn.; Fairfax Biological Laboratories, Clinton Corners, N. Y.; Goulard & Olena, Skillman, N. J.; Stearns Nurseries, Geneva, N. Y.; Swift & Co., Chicago; Plant Products, Blue Point, L. I., N. Y.; McCormick & Co., Baltimore; American Agricultural Chemical Co., New York; Atlas Powder Co., Wilmington; Al Kem Labs, Inc., Yonkers, N. Y.; Milligan Bros., Jefferson, Ia.; Drum Chemicals, Brooklyn; Ross Daniels, Des Moines; Blue Ridge Fruit Exchange, Waynesboro, Pa.; Science Products Co., Chicago; Rose Manufacturing Co., Beacon, N. Y.; O. M. Scott Co.; Marysville, Ohio; American Chemical Paint Co., Ambler, Pa.; O. E. Linck, Clifton, N. J.; Carbide & Carbon Chem Corp., New York; Boyle-Midway Co., Cranford, N. J.; R. L. Chacon Chemical Co. and Durham Chemical Co., of San Francisco; and Destruxol Corp., Pasadena.

A new type paper bag with a built-in handle is made by Equitable Paper Bag Co., Long Island City, New York.

The reader will note in the above list a rather heavy preponderance of names of smaller or medium sized companies. In the opinion of some observers in this field, the smaller company has a substantial advantage in the package goods field, because, in selling this market, service to distributors and dealers is highly important, and the smaller companies often are better able to service their accounts than are their bigger competitors.

A wide range of containers and products are seen on these two pages. Below are products manufactured and marketed by the Naugatuck Division of U. S. Rubber Co., Naugatuck, Conn.

At the top of page 41 are specimens of containers made by the Canister Co., Phillipsburg, N. J., and the lower group represents some of the merchandise marketed by Science Products Co., Chicago, Ill.


DU PONT
rose dust
DU PONT SOLUBLE PLANT FOOD 19-22-16
ACME
50% Wettable DDT
DURA DUST
No. 50
SHERWIN-WILLIAMS
VEGETABLE DUST
with 7% Copper and .75% Retenone
Niagara
SUSPENSO LEAD ARSENATE
POISON
ACP ROSE and FLORAL DUST
ALSO USED AS A SPRAY
DU PONT
FUNGICIDE A
PAR-ZATE ZINEB FUNGICIDE
ROOTONE
WITH FUNGICIDE
AMERICAN CHEMICAL PAINT
CHIPMAN
PARIS GREEN
POISON
Turfcleene
CHEMICAL GRASS EDGER
for WALKS · FLOWER BEDS
SEED PROTECTANT
SEEDTONE
SAFE TO USE
5% CHLORDANE DUST
6oz
ANTS
And other insects infesting LAWNS
CHLORDANE
45
A Product of Science
BERRY-SET
A HORMONE SPRAY FOR BIGGER BERRIES
JUST SPRAY THE BLOSSOMS
BIGGER MORE LUSCIOUS LONGER BEARING
STRAWBERRIES
SCIENCE PRODUCTS COMPANY · CHICAGO
50 to 100% LARGER BERRIES
2% CHLORDANE SPRAY
ROACHES
Stop-GRASS
Chemical Grass Trimmer
SAVES WORK OF MOWING LAWN EDGES
DELAYS GROWTH OF GRASS 4 TO 5 MONTHS!
Make TOMATOES Ripen 1 to 2 WEEKS EARLIER
Blossom-set
ARAMITE-15W
For Control of
RED SPIDER
and various other mites on
EVERGREENS
ROSES
FLOWERS, SHADE TREES, ORNAMENTALS, HORTICULTURAL STOCK, and on lawns, apples, beans (dry edible and fresh), peaches, walnuts,
SCIENCE PRODUCTS COMPANY
CHICAGO, ILLINOIS
OPEN OTHER END
Stop-GRASS
The Chemical Grass Trimmer
SAVES WORK OF MOWING LAWN EDGES
DELAYS GROWTH OF GRASS 4 TO 5 MONTHS!
SCIENCE PRODUCTS COMPANY • CHICAGO, ILL.
OPEN OTHER END
25% LINDANE
Wettable Powder
SEED TREATMENT
WIREWORMS
INSECTICIDE
SCIENCE PRODUCTS COMPANY
OPEN OTHER END
Take-Hold Plus
PLANT FOOD
for African Violets

Public Needs Education

A COMMON pitfall in attempting to develop a market in this small package field, states one marketer who has spent years in the field and should be in a good position to know exactly what he is talking about, is the salesman's tendency to oversell on a particular item. The public still needs a lot of education on the correct use of home garden insecticides, he points out, and this necessarily involves prior education of dealers and distributors before they can intelligently appraise and advise on use of the manufacturer's line of garden specialties.

It is essential, this observer points out, to have a program whereby sales clerks can readily find directions for use, the insects the product will control, and all other information needed for correct application. Full instructions on the package that the layman can follow are of course part of the picture, but the manufacturer must go further and see that the sales clerk in the seed or garden store has all the necessary background on his products if he is not to lose sales. Calcium arsenate still enjoys a relatively large sale, probably because users have been familiar with it for years, feel that they know something about it, and do not have to ask for explanations on what it is for and what it will do.

Combination container-dispenser types appeal to home gardeners since there is no added expense for purchase of applicator.

Some firms, particularly the past few seasons, have been selling direct to dealers. However, by far the larger number believe they can get their maximum sales potential by working through the usual distributor—dealer set-up. The distributor's salesmen may call on their dealer customers as often as two or three times a month, and this direct and frequent contact is very valuable, particularly at the time of year when dealer's stocks are moving rapidly. The manufacturer cannot duplicate

such coverage with his own salesmen, and when he attempts to bypass the distributor the results are often damaging to his sales curve. Nevertheless it is still all too common particularly for newcomers to the field, to sell dealers at distributors' prices on volume orders. This upsets the normal trade channels, and for the long pull a continuation of this trend could create considerable havoc in the small package market.

To reach the mass market, an advertising program must of course be set up to the consumer. Such programs normally are built around garden sections of Sunday newspaper supplements, home and garden magazines, etc., supplemented where funds are available by radio, television, etc. Of primary importance, howevere, is a sales service program for dealers, as outlined above. And it cannot be emphasized too strongly

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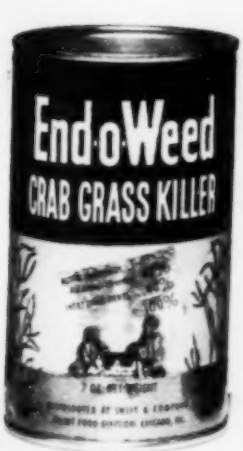
Photos, pages 42 & 43

Across the bottom of these two pages are agricultural chemical products marketed by Swift & Co., Chicago, Ill. "End-O-Pest Garden Dust," on page 42, comes in 8 oz. applicator package that can be refilled.

At the right (above), Michigan Chemical Corp., Saint Louis, Mich. offers two small sizes of its "Pestmaster" DDT for home garden use.



Questionnaire to fertilizer trade brings comments about 1953 season, high-analysis products, granulation & supply situation.

1954 Prospects "Fair" Fertilizer Makers Say

MANY new factors are entering the fertilizer sales picture for 1954 and not all of them are favorable. Some of these influences stem from government policy; others from the type of product being offered by the industry (granular and high-analysis grades) and still others from the economics of farm income across the board.

Just how these matters will affect the sale of plant food during the coming season is seen in different lights by fertilizer manufacturers across the nation. In response to a questionnaire sent out by *Agricultural Chemicals*, these industry representatives revealed a rather philosophic attitude toward the present situation and looked ahead with a considerable amount of confidence.

The questionnaire asked about how tonnage stacked up this past year in comparison to that of the previous season; how the future looks for sales during the next few years; whether there is a trend toward the use of high analysis fertilizers in their respective areas; is there a demand for granular products; and are government policies, with falling farm income, likely to result in resistance to fertilizer sales efforts.

Answers varied, of course. Most voiced optimism, but at the same time, those who did, also recognized the fact that more effort will have to be directed toward competitive selling. One midwestern manufacturer declared that farmers can be sold on using more fertilizer to reduce unit costs, but "it will take a lot of work." Another manufacturer, in the deep south, commented that "There has been a gradual education of the farmer to the fact that he can reduce costs per acre by use of more fertilizer . . . to produce greater yields on fewer acres," but indicated that, in his opinion, much more must be done along the line of selling.

Sales during the past season have been satisfactory, he said, with tonnage in his sales area (south Georgia and northern Florida) up about 5% over the year before. Price cutting in some portions of the area greatly reduced profit, however, so the increase in tonnage did not indicate a proportionate amount of extra money in the bank.

"The outlook for fertilizer sales for the next 4 or 5 years as a whole should be good," he continued. However, with the lowered purchasing power of the farmer . . . changed economic conditions, bad weather conditions in the form of both drought and floods in other areas, the potential may be altered somewhat.

As to the use of high analysis goods, this manufacturer described the trend toward this as being "very gradual" in his area. Farmers do not demand granular products, he reported, and some buyers object to the higher cost of this type of product.

A quite different viewpoint is expressed by a midwestern manufacturer who produces a granular product and distributes it in the states of Iowa, Kansas, Nebraska and South Dakota. He declares that future fertilizer progress lies in granular products and illustrates by pointing out that of nine competitors in his area, eight sell granular products. The ninth, he says, "undersells us four dollars a ton and is losing more tonnage each season."

"We believe that in the next four or five years, the use of mixed fertilizers will increase a minimum of 50%, considering the present farm marketing conditions. Any firm not producing a 15-15-0, 16-20-0 or 8-32-0 fertilizer in granular form will not exist long in our area," he predicts.

This firm, located in the wheat area, is not yet sure how acreage allotments will affect fertilizer sales. "But," he says, "our sales department is continually fighting the battle of lower unit cost and more bushels per acre."

"We feel very fortunate to be located in an area where moisture has been above average," he concludes. "We firmly believe in the old Tom Cat story—if you make the calls, you get results. We are backing this up with a high analysis granular product with five-minute service!"

Jumping from the wheat belt to a fertilizer firm on Long Island, New York, the outlook is somewhat similar. The history of fertilizer usage on the island dates back many years and the per acre application is high, this manufacturer points out. Furthermore, his area predominates in cash crops with potatoes and cauliflower in greatest abundance. This makes for a high acre value, which of course has a bearing on the grower's attitude toward fertilizer use.

"Tonnage-wise, our 1953 business exceeded 1952, by 4.2%," he reports. "The dollar increase was slightly higher due to a better retail price for certain direct application materials," he added. Tonnage will continue high, although slightly under the 1953 level, even in the face of a possible reduction in potato acreage, this eastern manufacturer predicts.

There is no particular demand for high analysis grades on this section of Long Island, he reports, and no trend exists as to direct application material. However, "concentrated sales effort could start a trend," it is stated. "Mixed fertilizers are price competitive here and our nearness to many sources of the materials needed in the single strength goods wipes out much of the advantage enjoyed by double-strength goods in areas such as Aroostook County (Maine) that have a longer freight haul. In addition, there are certain agronomic advantages in single strength goods for our crops."

As to granular products, he reports that there has been no apparent demand, and he expressed doubt that growers in the area would be willing to pay any premimum for this type product.

He also stated that in general, fertilizer sales per acre tend to increase under government allotments. "Several years ago when potato a reage was cut, under the support program, our growers immediately increased the acreage application of fertilizer."

"Fall Tonnage Slow"

A MARYLAND concern which does business not only in the East, but also in the midwest, reports a smaller volume of sales for 1953, although the spring sales were approximately even with those of the previous spring. "Fall tonnage is slow and it appears that we will wind up the fall season off 10 to 15 per cent from last fall," this spokesman says.

"It appears to me that fertilizer sales over the next four or five years will be influenced by agricultural income. There may be some thinking to the contrary, but I feel this is true in the East and in other using areas with a longer fertilizer history.

"The effect of reduced agricultural income in the middle west has yet to be determined, since the increase in tonnage in that section has come along with increased agricultural income in general. We would like to think that our business would continue to expand in volume because of its basic characteristics and the known reduced cost of agricultural production with the use of fertilizer, but this remains to be proved.

"In general, we do not see any trend toward an increase in demand for high analysis goods and the question of granular products remains to be answered. In some spots the extra cost is taken in stride, but how long this will continue, also remains to be developed.

"As to the reaction of farm-

Sales department continually "fighting the battle of lower unit cost and more bushels per acre," reports one fertilizer manufacturer. Increased emphasis on sales efforts is seen in practically all questionnaire replies

ers to federal agricultural policy, I believe that this will have a definite bearing on fertilizer tonnage for next year, because fertilizer constitutes a substantial investment for most farmers, and they are by nature, conservative."

"We cannot tell yet from our business and other indications, whether or not the cut and acreage allotments for 1954 will result in the use of more fertilizer on fewer acres. We have had a slight indication that this will follow, but it is by no means a definite trend," the Maryland executive concluded.

Additional comments on the fertilizer situation come from an Alabama firm doing business in an area where fertilizer materials have been sold and applied for many years. This company spokesman reveals an optimistic view of the general scene. "Although some fertilizer companies in the southeast have complained of decreased sales, our tonnage for 1952-53 is approximately 10% over the previous year. We anticipate, however, that we will do well to maintain this tonnage figure during the coming year, in view of the coming crop allocation for cotton. But over the long pull, we are optimistic for the future of fertilizer sales," he declares.

He observes that high analysis fertilizers, although not particularly popular in his area, do have a promising future. "At the same time," he adds, "we do not believe that farmers, faced with declining farm prices, will reach into their pockets and pay $85 to $90 per ton for a 13-13-13 grade when they can purchase a 4-10-7 grade for $38 to $40."

This southern business man says that granular fertilizer is being used to a certain extent in northern Alabama, but adds that the two dollars a ton of added cost will be unpopular in a year of declining prices.

"Cotton acreage will be at a premium next spring. We are guessing that we will be able to plant about 75% of the 1953 acres. In allocation years of the past, farmers have stepped up their fertilizer rate per acre in an effort to produce the same number of bales on fewer acres.

"We cannot be too optimistic on margins of profit on fertilizer sales during the 1954 season. The field is becoming very competitive here in the south. We anticipate that our profit per ton during the coming year will be the smallest of our 50-year history. All materials are in ample supply, including ammonium nitrate," he said.

Extending his predictions a little farther, he said that "We do not anticipate any change in supplies during the next twelve months, but rather expect them to become more plentiful, with possible reductions in prices on some materials."

Still another midwestern manufacturer adds his comments to previous remarks by his contemporaries in the business. He reports that his company "enjoyed a very nice increase during the spring season of 1953, and the total year's business will be greater than that of 1952."

He adds a familiar note, however, in saying that the firm has experienced a drop in fall sales. "This is attributed to two factors," he says. "First, we are having a severe drought in the entire Ohio Valley and dry weather extends over most of the middle west. No rains of any consequence have fallen since the last week in July. Secondly, the allocation of wheat acreage has created a great deal of uncertainty for many wheat growers, and many small growers have abandoned their acreage allotments due in part to dry weather. The allocation of wheat acreage, we believe, will create a healthy situation although it has affected our sales temporarily.

"There is a substantially greater demand for high analysis fertilizers. More and more farmers are learning the value of fertilizers, and many of them are continuing to use the same number of pounds of fertilizers per acre and are, therefore, increasing the plant food per acre.

"Granular fertilizers are pretty much in the talking stage with very little demand from the customer so far. Some of our territories are buying more of their fertilizers in bulk. It is doubtful that the consumer will pay much of a premium for granular fertilizers and, where they buy in bulk, they feel that there is very little advantage in granulation.

"There is a real challenge ahead in the marketing of fertilizers, but it will require intelligent and aggressive selling. The agricultural colleges are doing a splendid job in selling the economics of fertilizers to the farmers, but the fertilizer industry itself also has to remain aggressive.

"We encourage our customers to establish check plots so that they can prove to themselves the value of more plant food per acre. Many additional tons of plant food will be sold through this method.

"The continued growth of the population of this country will put greater demand on food production on our lands. With a promising market ahead of us, we should be able to maintain a very satisfactory level of production," he concludes.

The situation on the Atlantic Seabord is reflected upon by a New Jersey manufacturer who has some special problems to report. In contemplating this season's sales, he says that "the 1953 fertilizer year has been very much on a par with 1952. I would say there might be a slight increase."

"As you probably know" he says, "Central Jersey farmers have had quite an adjustment to make since they have cut back on their potato acreage, namely, from 70,000 acres to 25,000. This leaves 45,000 acres to be planted to other crops, such as corn, wheat, soybeans and a small acreage to processed vegetables, that our farmers have not been accustomed to raising.

"Starting from a low point in 1952 when our central Jersey farmers made their first big switch from potatoes to other crops, they thought they didn't have to fertilize these other crops very heavily and were quite surprised when their yields were not up to expectation. Now, after two years, they have decided that it takes big yields to make ends meet on

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C. M. FERGUSON

LOUIS WARE

HON. RICHARD RUSSELL

Big names on program for Atlanta, Georgia, meeting of

National Fertilizer Association

WITH the Biltmore Hotel as headquarters for the National Fertilizer Association's annual Fall Convention in Atlanta, November 16-18, the final program has been announced by the Association. The Board of Directors meets Monday morning, Nov. 16 and the executive committee will hold a session on the evening before, preceding the general sessions which begin Tuesday morning.

The following program is slated for the convention:

Sunday, November 15

7:00 p.m. Executive Committee Meeting

Monday, November 16

10:00 a.m. Board of Directors' Meeting

Tuesday, November 17

10:00 a.m. General Meeting

Louis Ware, President, International Minerals & Chemical Corporation and Chairman, Board of Directors, The National Fertilizer Association, presiding

"Broadening the Base of the Fertilizer Market" W. R. Allstetter, Vice President, The National Fertilizer Association

"Fertilizer . . . A Cornerstone for Community Development" Raymond Rosson, County Agent, Jonesboro, Tennessee

"Putting Agricultural Research to Work" C. M. Ferguson, Director of Extension Service, United States Department of Agriculture

6:30 p.m. Cocktail Party—Compliments of Ashcraft-Wilkinson Company

7:30 p.m. Annual Fall Banquet—Empire Room—Louis Ware, Toastmaster

9:00 p.m. Entertainment and Dancing

Wednesday, November 18

8:30 a.m. Meeting—Committee on Publications

10:00 a.m. General Meeting
Chairman Louis Ware presiding
"Selling—The American Way"
J. Roger Deas, Atlantic Division Representative, American Can Company
"What's Ahead for the American Farmer"
Senator Richard Russell of Georgia
Business Meeting

12:00 Noon Adjournment

What's new in emulsifiers for 1954? A review of the characteristics of some of the new and old materials, with suggestions as to how to select the best emulsifying agent for each application and how to formulate properly to assure optimum results in the field

Emulsifiers for

WHAT'S NEW IN EMULSIFIERS

By Ninol Laboratories, Inc.

IT is now just about ten years since the advent of DDT first created a demand for synthetic emulsifying agents in the field of agriculture and public health. Prior to that time most of the pesticides in common use were inorganics like the arsenates and Bordeaux, together with a few naturally occurring botanicals such as rotenone and pyrethrum, all of which were applied without wetting agents or emulsifiers except for the occasional addition of a little soap.

When DDT first reached the United States it was recognized that the best method of application would be to dissolve the powder in an aromatic solvent and emulsify this in water. A number of laboratories began to screen the synthetic emulsifiers available at that time—the USDA laboratories at Orlando, Fla. being perhaps most active. Their general conclusion was that certain non-ionic emulsifiers (ethylene oxide derivatives) gave the most stable emulsions in both soft and hard waters. The anionic emulsifiers then available often gave good results in soft water, but not in hard water. Largely as a result of this early work with DDT, most of the pesticide emulsifiers used throughout the forties were of the non-ionic type.

Within the past few years, however, the simple non-ionic emulsifiers have slowly begun to lose their dominant position. As new toxicants like parathion, toxaphene, chloro IPC and others were introduced in rapid succession, it became apparent that the non-ionics did not always give satisfactory performance. For one thing, the non-ionics often failed to impart spontaneity of emulsification when used at economical levels, so that a relatively high degree of agitation was required to obtain good dispersion. Since many spray rigs and other equipment such as dipping vats and knapsack sprayers are not equipped with agitation, this presented a problem. Furthermore, the increasing use of low gallonage sprays makes it necessary to distribute a small amount of toxicant very evenly over a large area. This makes "tight," slow-creaming emulsion increasingly important, but most of the non-ionics (at the 3-5 per cent use level) produce emulsions that cream quite rapidly.

These and other problems prompted a search for more effective emulsifiers, and increasing attention began to be paid to blended types containing both non-ionic and anionic components. One such blend had actually been found satisfactory for DDT in the early Orlando work, but seems to have been largely overlooked subsequently, and it was not until about two years ago that these blends really began to come into their own.

Today, several different types of anionic-non-ionic blended emulsifiers are being marketed, and many of them give definitely better performance then the straight non-ionics, especially in harder waters. Surprisingly enough, however, most of these blends do not give peak performance in soft waters, particularly with respect to spontaneity. Since many areas of the country have very soft water, it is important to achieve good performance here too.

Clearly recognizing this problem, work was initiated at Ninol Laboratories three years ago aimed at developing special anionics that would produce blended emulsifiers with top performance in *both* soft and hard waters. Because of its unique position as the only producer of oil-soluble sulfonates by the new sulfur trioxide process, Ninol was able to investigate a large variety of novel anionics not formerly available. Certain of these proved to be the key to soft water dispersibility and were subsequently used as the base for Ninol's "Toximul" series of blended emulsifiers, which are marked by an unusually high degree of spontaneity or "flash dispersibility" in both soft and hard waters. In addition, the "Toximuls" are effective at low concentrations, give slow-creaming emulsions, have good stability in storage and are economical. This combination of properties has led to rapid acceptance of these emulsifiers by the industry.

"Toximul" emulsifiers being recommended for 1954 are:

1954

"Toximul 150" for toxaphene, heptachlor, strobane, 4-lb. chlordane
"Toximul 250" for chloro IPC and pentachlorphenol.
"Toximul 300" for DDT, aldrin, chlordane, 2,4-D
"Toximul 400" for BHC, dieldrin, lindane, 2,4,5-T

Several special emulsifiers for other systems are also available.

EMULSIFIERS vs. TOXICANTS

By The Emulsol Corporation

THE emulsification of insecticides and herbicides today involves more than just a matter of convenience and cost. When organic toxicants were relatively new and the demand growing for emulsifiable concentrates, most formulators were able to utilize the "universal" or *versatile* type of emulsifier to handle many formulations for a wide variety of conditions to simplify production and inventory problems. Our product "Emcol H-77" is of this type.

However, the rapidly increasing number of toxicants brings with it a corresponding number of highly complex problems, while advances in formulation technology and economic considerations tend to reduce drastically the use level of emulsifiers in the liquid concentrate.

To assure proper performance in the field under these conditions, it is now necessary to select highly specific emulsifiers, almost on a prescription type of service, to satisfy each individual formulator's needs. Recent development of a large number of low volatile esters of 2,4-D and 2,4,5-T and of the carbamate type of herbicides raised many special formulation problems. To illustrate, an emulsifier for a given low volatile 2,4-D ester to be used with water alone will not be the same as one required for an application calling for dilution with oil prior to the emulsification in water. Similar specialized formulation problems arise in new insecticide toxicants as well, such as malathon, strobane, and others, to name but a few.

An entirely "specialized" group of emulsifiers built for such specialized needs is represented by the "Emcol H-80" series. These newer products not only have been fully tested and satisfy the performance requirements for varying water hardness conditions, spontaneity, and tightness of emulsion, but also have the necessary stability.

In the development of new pesticides, the basic producer should enable the emulsifier manufacturers to develop a suitable emulsifier at the earliest feasible stage of development, so that subsequently when the toxicant becomes commercially available, the formulator will be ready with the proper formulation. In the case of established toxicant products, the formulator is invited to challenge the ingenuity of the colloid chemist for greater performance values through better emulsifiers.

When the question is therefore raised "what's new in emulsifiers for 1954," the reply will be dependent upon the answer to "what new toxicants will there be in 1954" or "what new application requirements will there be for 1954."

Lastly, it is in the best interest of the formulator to look around in the field and judge emulsifier selection for the next season based upon "what is old in emulsifiers for 1954" to choose the products that have weathered the past seasons of storage and abuse and have come up as functionally suitable materials for relatively trouble free performance.

NEW "ANTARA" EMULSIFIERS

By General Dyestuff Corporation

ANTARA Chemicals Division of General Dyestuff Corporation has recently introduced three new non-ionic surfactants — "Igepal CO-530," "Igepal CO-610," and "Agent OC-O-158." All three products are essentially 100 percent alkyl phenoxy polyoxyethylene ethanols derived from the same alkylphenol.

"Igepal CO-530" is of interest as an emulsifier for four pounds per gallon toxaphene formulations, and as a coemulsifer when used in combination with other surfactants.

"Igepal CO-610" is an emulsifier of the "Igepal CO-630" type, but produces less foam. It should be of interest in formulations where a low foaming non-ionic surfactant is required. "Igepal CO-610" should also be useful in the formulation of blended emulsifiers when used in combination with other surfactants.

"Agent OC-O-158" is an oil soluble surfactant which may be useful as a co-solvent and emulsion stabilizer or an anti-foaming agent in combination with other surfactants.

All three of these new products are members of the Igepal CO series which includes "Igepal CO-430," "Igepal CO-530," "Igepal CO-710," "Igepal CO-730," "Igepal CO-850," and "Igepal CO-880." All members of this series are becoming of greater interest in the formulation of blended emulsifiers with anionic, non-ionic and cationic surfactants.

The widespread use of blended emulsifiers has encouraged formulators to investigate the possibilities of preparing their own emulsifiers by using blends of commercially available surfactants. Surfactant blends have been used in wettable powders for a number of years, but they have become popular in emulsifiable concentrates only recently.

The emulsifiable concentrate formulator can derive a number of benefits from preparing his own blends. The performance of his formulas can frequently be improved by small variations in the proportions of the surfactants used. It is more difficult for competitors to duplicate

his formulations. He can frequently use one or more common surfactants in all of his blends. This gives him greater flexibility in his operations, as these surfactants may be used in a number of his formulas.

The Commercial Development Department of General Aniline and Film Corporation is market testing new research and pilot plant surfactants which are earmarked for later addition to the G.D.C. agricultural emulsifier line. Foremost among these is the "Agent 180" series of high molecular weight alkyl phenoxy polyoxyethylene ethanols which are designed to possess superior hydrocarbon and toxicant compatibility together with the well-known chemical stability of the "Igepals."

NEW ROHM & HAAS EMULSIFIERS

By Rohm & Haas Company

TWO new members of the Rohm & Haas family of agricultural emulsifiers are "Triton X-150" and "Triton X-160." Introduced for the 1953 season, they are designed to provide good emulsion performance for a large variety of agricultural formulations when used either individually or in simple blends with each other. Originally, these emulsifiers were intended for the formulator of insecticides for the cotton grower. In this field they demonstrated their effectiveness with such toxicants as toxaphene, DDT, dieldrin, aldrin, BHC, etc. At the same time, they were proving their usefulness in more general formulations.

Both "Triton X-150" and "Triton X-160" are blends of alkyl aryl polyether alcohols and organic sulfonates, all of which are manufactured by Rohm & Haas Company. Physically, these products are brown liquids having a specific gravity of approximately 1.06 with a medium to slightly heavy viscosity. "Triton X-150" has the lower viscosity at ordinary temperatures.

The rate at which new pesticides and new solvents for agricultural formulations are being introduced makes it increasingly difficult for any single emulsifier to be effective with all toxicant-solvent combinations. The varying performance obtained with emulsifiers when toxicant systems are altered by solvent changes is well known. Generally, this means the formulator must stock several emulsifiers in order to take care of his full line of products. "Triton X-150" and "Triton X-160" were designed as companion products for use either individually or in combination in simple ratio so that they can adjust themselves to solvent changes in a formulation. They are intended to give good emulsion performance to a larger number of toxicant-solvent systems than ordinarily could be obtained with one or two single emulsifiers.

They have this advantage: If either one, by itself, does not give the desired performance in an emulsifiable concentrate, then the two can be blended in a simple ratio to yield the desired result. Blends on the order of 1:5, 1:2, 1:1:, 2:1 and 5:1 have been found to give a serviceable range. With these ratios, there is usually no need to seek an entirely different emulsifier when a new toxicant or solvent is considered in the manufacturing process. Thus the formulator need maintain an inventory of only two emulsifiers for a large number of finished formulations.

Emulsion performance is affected greatly in many instances by the hardness of the water used in the spray application. Formulation recommendations for "Triton X-150" and "Triton X-160" provide satisfactory performance over a broad range of water hardness. Good performance is usually obtained over the wide range from the very soft water of the Mississippi Delta to the extremely hard water of the Pecos River Valley, as well as in a number of intermediate synthetic hard waters. Frequently, the formulator can point up emulsion performance to suit the properties of the water of a specific area merely by adjusting the ratio of "Triton X-150" to "Triton X-160." Emulsifier levels are recommended which, in most cases, are economically attractive. This holds true whether the formulation aims at satisfactory performance over a wide range of water hardness, or is specially designed for application in extremely hard or extremely soft water.

It appears likely that continued development work on toxicants and solvent systems will expand the usefulness of "Triton X-150" and "Triton X-160" and these emulsifiers will show even greater versatility than they already have demonstrated.

TIPS ON EMULSION FORMULATION

By Atlas Powder Company

THE following application tips are another addition to the growing reservoir of information which can give the formulator a healthy push in the right direction when he sets out to build an emulsion.

(1) Use of emulsifier blends—Proper balance of the oil-loving and water loving groups within the emulsifier molecule must be obtained to achieve emulsion stability. Although single emulsifiers are sometimes used, blends of emulsifiers can frequently supply the proper ratio more efficiently. Representative of emulsifier types most commonly used in blends are sorbitan fatty acid esters combined with their polyoxyethylene derivatives. The former products tend to be oil soluble, but dispersible or insoluble in water, while the latter are soluble or dispersible in water. In working with these blends, it is suggested that reference be made to a method of selection known as the HLB system—a method of matching the emulsifier with the job it is required to do in the emulsion.

(2) Method of adding emulsifiers to formula—When using a combination of emulsifiers at fairly high concentrations to get oil-in-water (O/W) emulsions, best results are usually obtained if the emulsifier is dispersed in the oil phase and the water is added slowly to the mixture to the inversion point (W/O to O/W), then added more rapidly. When very little emulsifier is used, it is best to add the oil and emulsifier to the water in a pre-mix, then homogenize the coarse emulsion.

(3) Temperature of oil and aqueous phases—The temperature of the

oil phase and the aqueous phase should be approximately the same at the time of emulsification. To allow for cooling during addition, it is best to have the phase to be added about two degrees warmer than the other phase. If waxes are a part of the oil phase, the temperature should be at least 10 deg. F. higher than the melting point of the wax.

(4) Melting oil phase ingredients—When the ingredients of the oil phase must be melted, heating of the batch should be done without local overheating. Use of jacketed equpiment is good practice.

(5) Making O/W soap type emulsions—If the emulsion is to be O/W soap type with the soap formed "in situ," the best method is to add the alkali in solution to the melted oil phase containing the fatty acid to be saponified. In this manner, the soap content or emulsifier content is increased gradually as the water is added, and a smoother emulsion will result.

(6) Making W/O emulsions—It is best to add water to the mixture of oil and emulsifier, and then to homogenize the emulsion. Homogenization may not be necessary if a small amount of a hydrophilic emulsifier is used in addition to the strong W/O emulsifier.

(7) Avoiding air entrapment in emulsion—If air is trapped in the emulsion, stability may be greatly reduced because the emulsifier tends to migrate to the liquid-air interface instead of remaining at the oil-water interface.

The most common cause of the incorporation of unwanted air in an emulsion is vortex formation, which can easily be seen on the surface of an emulsion during preparation. The vortex can be eliminated by providing an inexpensive metal or wood baffle in the mixing vessel.

(8) Use of preservatives and anti-oxidants—These should be added to emulsion-type products because sterile conditions usually cannot be maintained throughout manufacture and use. When vegetable oils are used, the use of an anti-oxidant is suggested. An anti-oxidant or preservative manufacturer should be asked for recommendations on specific problems.

(9) Controlling viscosity of the emulsions—Viscosity may be altered in several ways. If the viscosity is too high, the proportion of external phase may be increased, or the viscosity of the external phase may be decreased. Sometimes the addition of a hydrophilic surface active agent will promote decrease in viscosity. Viscosity may be raised by adding thickeners to the external phase, by increasing the proportion of the internal phase, by including such higher melting components as solid fatty acids and solid fatty alcohols in the internal phase or by incorporating air as a third phase.

(10) Source of formulation ingredients—Avoid variations in the source of raw materials. Even seemingly unimportant changes can easily upset the stability or another important characteristic of an established formula. For instance, seasonal changes in local water supply or changes in the source of supply of the ingredients or in preparation conditions can have disappointing results.

RECENT DEVELOPMENTS IN T-H EMULSIFIERS

By Thompson-Hayward Chemical Co.

THE Thompson-Hayward Chemical Company recently entered the emulsifier field with four new emulsifiers for the formulation of liquid insecticidal and herbicidal concentrates. These products satisfy most of the emulsifier requirements of the newer pesticides.

With their background of experience in the formulation of agricultural pesticides, Thompson-Hayward researchers felt that more consideration should be given to certain practical aspects of emulsifier evaluation. Emulsion stability, spontaneity of formation, action in waters of all degrees of hardness, and storage stability of emulsion concentrates previously have received much emphasis. On the other hand, emulsifiers often are appraised by blending them with pesticide ingredients carefully prepared in the laboratory. Thompson-Hayward investigators recognized the need to employ ingredients dissolved and processed in factory equipment in these tests. Further, they stressed the importance of making dilution tests with emulsifiable concentrates at the levels normally employed for field application. The use of an arbitrary test dilution of 1 to 100 with water can be very misleading, if the emulsifiable product actually is used at a 1 to 10 or 1 to 30 dilution. Also, many laboratory tests had indicated that optimum results for each toxicant could not be obtained with the same emulsifier. Careful consideration was given to these factors.

Laboratory tests demonstrated that the total solids content of natural waters must be considered in addition to the degree of hardness. Emulsifiers which gave excellent emulsions with very hard waters frequently gave unsatisfactory emulsions with relatively soft waters with high total solids content. Also, emulsifiers which produced satisfactory emulsions in waters with high total solids content frequently gave poor emulsions in waters with low total solids content and of a relatively low degree of hardness. Consequently, it was found desirable to use samples of natural waters obtained from wells, lakes, rivers, and city water systems throughout agricultural areas in the development of our line of emulsifiers.

Thompson-Hayward emulsifiers are balanced blends of different emulsifier components. Studies have indicated that seldom does one single chemical compound meet all of the requirements of a good emulsifier. Proper blending and careful consideration of the molecular size of the components can provide the proper water solubility-oil solubility balance and furnish the required action in both hard and soft waters, making the emulsifier suitable for use with a selected group of insect toxicants. For another group, a different blend will be needed to give optimum performance.

Four different emulsifier blends were found suitable for preparation

(*Turn to Page* 125)

A Study of the

Persistence of CMU in Soil

EXPERIMENTS with the herbicide CMU (3-parachlorophenyl-1,1-dimethylurea) at the Federal Experiment Station in Puerto Rico, Mayaguez, P.R., and elsewhere, have shown the material to be potent, non-selective and capable of controlling most weeds when applied at relatively low rates *(1,2,6)*. Experiments have also shown that the persistence and effectiveness of CMU in the soil is apparently dependent, to a large extent, on prevailing environmental conditions such as temperature, soil moisture, soil texture and other factors. The effects of some of these variables on the persistence and movement of CMU in the soil were evaluated in the following series of field and greenhouse experiments.

Experimental

EFFECTS of environmental factors on the persistence of CMU in the soil were determined by using procedures and techniques essentially the same as those used in similar series of experiments with sodium pentachlorophenate *(5)* and sodium trichloroacetate *(4)*.

Wooden flats 1½ feet x 1½ feet x 3 inches were divided with wooden partitions into 12 compartments 6 x 4½ x 3 inches. Drainage was provided by a ¼-inch opening covered with wire screen in the bottom of each compartment. The soil to be treated was placed in the flats to a depth of 2½ inches. Applications of CMU were made to triplicate compartments in each flat at rates equivalent to approximately 0, 1, 5, and 10 pounds per acre. Aliquots from a stock suspension of the 80% wettable formulation were diluted to 30 ml. and sprayed uniformly onto the suface of the soil in each compartment. One series of flats was planted, immediately after treatment, with USDA-34 sweet corn and velvet beans at the rate of 10 seeds of each species per compartment. The remaining flats were covered and stored at room temperature (except as noted in the temperature experiment), and at intervals of 2, 4, and 10 weeks after treatment one flat from each treatment was removed and planted to corn and beans and placed in the greenhouse. Emergence counts were made 10 days after planting, and after 21 days fresh weights of plant tops from individual replications were obtained.

Effect of Temperature

TEN flats were filled with a uniform mixture of a fertile sandy loam soil, watered to saturation, and allowed to drain for several hours before the CMU was applied. One flat was planted immediately and the remaining flats were covered with waterproof paper. Three of these flats were placed in a seed storage room at a temperature of 10° C., three were left at room temperature which fluctuated between 20° and 30° C., and three were placed in an electric oven at 45° C. Moisture content of the soil was maintained as nearly as possible in a condition suitable for planting during the storage period by partially immersing the flats in water and allowing the water to rise into the soil by capillarity. This was done at least once every 2 weeks with the flats stored at 45° C., and less often with those stored at room temperature and at 10° C.

The toxicity of CMU, as measured by the growth of corn and velvet beans in treated soil, persisted longer at 10° C., than it did at room temperature or at 45° C. There was no consistent difference in persistence of the herbicide between the two warmer temperatures. As would be expected, the toxicity was more prolonged at the higher rates of application at all temperatures.

Soil treated with CMU at the rate of 5 pounds per acre and stored at 10° C., remained toxic to corn and velvet beans for the duration of the experiment (10 weeks). Soil treated at the same rate but stored at room temperature or 45° C., lost its toxicity to the beans within 2 weeks and to corn within 10 weeks.

In general, the corn appeared to be more sensitive to CMU than did the velvet beans under the greenhouse conditions but the reverse was true in the field experiments.

Effect of Soil Moisture

TEN flats were filled with air-dry, fertile, loamy soil. Three of the flats were watered to field capacity (about 36 per cent) and maintained as near as possible at that level throughout the experimental period. Four flats were watered to field capacity and then allowed to dry until a moisture content of about 20 per cent was attained at the time of treatment. The three remaining flats were not

by
A. J. Loustalot, T. J. Muzik, and H. J. Cruzado

Assistant Director, Plant Physiologist and Agronomist, respectively, Federal Experiment Station in Puerto Rico, Mayaguez, P. R.

watered except for the amount applied (30 ml. of suspension per compartment) at the time of treatment. The moisture content of the air-dry soil was about 11 per cent. All the flats were treated with CMU as in the foregoing temperature experiment. One flat of the medium moisture treatment was planted immediately with the corn and velvet beans. The remaining flats were covered and stored for periods of 2, 4, and 10 weeks before being planted. At the time of planting, the moisture content of the air-dry flats was brought to the level suitable for germination by partially immersing the flats in water and allowing the water to rise into the soil.

At the 1-pound-per-acre-rate, the toxicity of CMU to corn and beans was dissipated within two weeks after application at all moisture levels. At the 5-pound rate, two weeks were required for the toxicity to disappear in soil with a saturated moisture level, and four weeks at the medium level, but at least ten weeks were required for the toxicity of the 5-pound rate to disappear in dry soil. At the 10-pound rate, the CMU toxicity had dissipated within ten weeks in medium and saturated soil, but was still present in air-dry soil at the end of that time.

Effects of Soil Texture

THREE flats were filled with a light sandy soil, three were filled with a heavy clay soil, and three were filled with a uniform mixture consisting of equal parts of both soil types. All the flats were watered several times with a complete nutrient solution and one of each soil type was planted immediately to corn and velvet beans. The remaining flats were covered and stored for 0, 2, 4,

(*Turn to Page 97*)

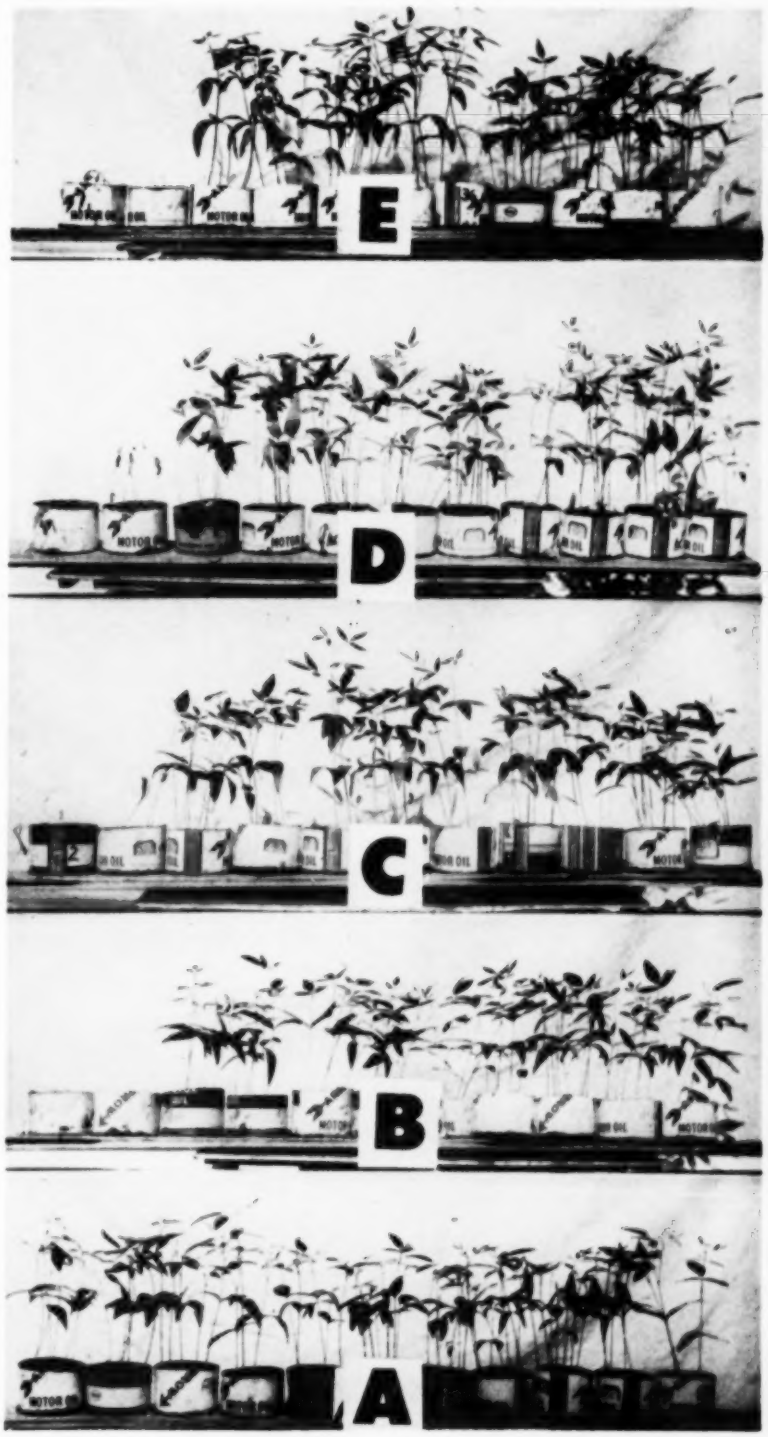


Figure 1.—Growth of pigeon peas 21 days after planting in untreated soil, A, and soil treated with CMU followed by no water, B, ¼-inch rainfall equivalent, C, ½-inch rainfall, D, and 1-inch rainfall, E. First two cans beginning at left in all series contain soil from surface to ½ inch and ½ inch to 1 inch. Third to ninth cans contain soil from 2- to 8-inch depth sampled at 1-inch intervals.

Case Histories, Accident Prevention, CO$_2$ Demonstration, Features of the Chicago

Fertilizer Safety Meeting

A PANEL discussion on case histories, talks by leaders in fertilizer safety throughout the United States, and a demonstration of the use of carbon dioxide in reducing hardened fertilizer piles, were features of the third annual meeting of the fertilizer section of the National Safety Council in Chicago, October 21 and 22. The group named as chairman for the coming year, Vernon S. Gornto, Smith-Douglass Company, Norfolk, Virginia. Mr. Gornto succeeds John E. Smith, Spencer Chemical Company, Kansas City, Missouri. The new vice-chairman for 1954 is Thomas J. Clarke, GLF Soil Building Service, Ithaca, New York; and Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, Virginia will be secretary-treasurer for the coming year.

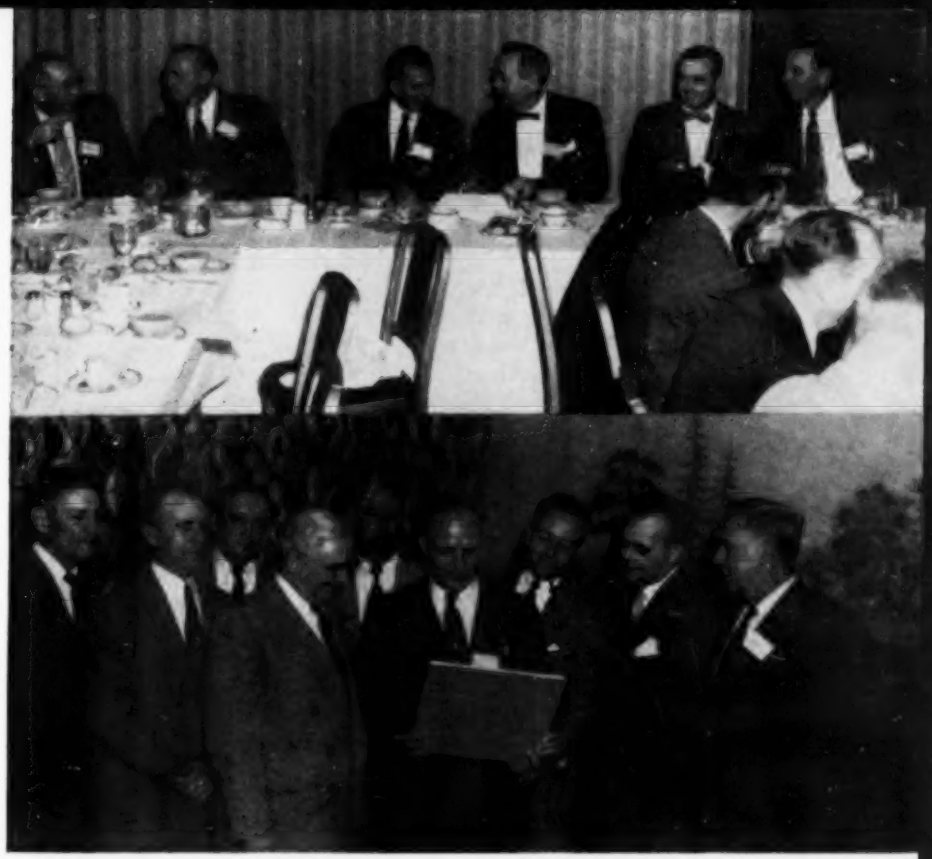
In his report before the group, retiring chairman Smith reviewed the year's activities, reporting that of those participating in the fertilizer contest during the past year, 65 companies came through with perfect accident records. He reported also that a total of twelve new posters have been produced by the section during the past year. This compares very favorably he said with any other section of the National Safety Council since it is quite unusual for any group to generate this many ideas and get them in print in a single year.

Mr. Smith reported a good response from the questionnaires sent out during the past year and expressed hope that during the coming year even more companies will respond. He commented that the 1952-53 year has been "very successful".

An inspirational talk which described safety as "a way of life" was presented by Dr. S. L. Rankin, E. I. Dupont de Nemours & Co.,

Photos this page:
Speakers, top to bottom: Forrest H. Shuford; Dr. S. L. Rankin; Ralph J. Crosby and Dr. Neal Bowman.
Below: Two chartered buses were loaded to capacity to transport fertilizer men to CO_2 demonstration at International Minerals & Chemical Corp. plant at Chicago Heights, Ill. Center: Part of crowd watching as workmen (right) prepare to insert CO_2 cartridge into pile of hardened superphosphate in storage.

Excellent attendance at third annual meeting of Fertilizer Section. Enthusiastic discussions from floor indicate deep interest in making safety an integral part of industry program throughout the U. S.



Inc., Wilmington, Delaware. Dr. Rankin told the group that the basic study of safety is one which causes people to think of it all the time. Without this type of underlying philosophy, the safety movement cannot possibly succeed.

"The kind of safety we want to see achieved can be brought about only by the combined effort of the experts and also of the laity." The right attitude must be maintained by everyone involved and the idea must be approached in a down-to-earth manner in order for its ideals to be grasped by most people.

Safety is more than mere statistics, he said. An impact must be

Photos this Page:

Top: Speakers' table at luncheon sponsored by APFC: L to R: Forrest H. Shuford, Raleigh, N. C.; Thomas J. Clarke, Ithaca, N. Y.; John E. Smith, Pittsburg, Kansas; Louis H. Wilson, APFC, Washington, D. C., host; Curtis A. Cox, Richmond, Va.; and Jack Fields, Borger, Texas.

Second photo: Davison Chemical Corp. group inspecting framed certificate presented A. B. Pettit by National Safety Council. L to R: George Mack, plant superintendent, Lansing, Michigan; John A. Corbett, Jr., assistant plant superintendent, Columbus, Ohio; W. P. Stansbury, operations manager, Mixed Fertilizer Division, Baltimore, Maryland; B. C. Manker, district manager, Lansing, Michigan; J. R. Terry, safety engineer, Phosphate Rock Division, Bartow, Florida; A. B. Pettit, supervisor, Industrial Health and Safety, Baltimore, Maryland; W. N. Watmough, Jr., vice-president, Baltimore, Maryland; George Klein, district manager, Nashville, Tennessee; and B. P. Jones, general mines superintendent, Phosphate Rock Division, Bartow, Florida.

Third photo: "Case Histories" panel members. (Rear) Relph Fraser, Baltimore, Md.; Richard C. Bennett, S. Omaha, Nebraska; and Harold R. Krueger, Topeka, Kansas. (Front): Victor L. Cherry, Little Rock, Ark.; George F. Dietz, Baltimore, Md.; W. A. Stone, Jacksonville, Fla.; and John E. Smith.

Fourth row: Mr. Smith again; Mr. Shuford; Mr. Wilson and Mr. Cox. G. B. Morris, Mr. Fields and R. J. Diserens

Lower row: A. B. Pettit, Ralph J. Crosby, New York; and John S. Roszel, Baltimore, Md. Mike Ellison, Yazoo City, Miss.; Stewart Washburn, National Safety Council, Chicago; and Jack McKenna, El Dorado, Ark.

made upon minds, and this is not always easy. To get the point across it requires a "wallop with the fist, not a mere tap with the fingers," he said.

We need to stir, agitate, and arouse the public to bring about full consciousness of safety. Such consciousness must be at work all the time. Safety is a way of thinking. It makes us careful, not careless; it makes us thoughtful rather than thoughtless and irresponsible; courteous, not rude. "Life and Safety are one and inseparable" he declared.

He urged his listeners to get "red hot" rather than remaining lukewarm and indifferent to the needs of safety. He asked his hearers to get off the sidelines and into the game. No committee is big enough nor effective enough to do the entire job unless every man involved is in there "punching".

Dr. Rankin insisted that accidents *can* be prevented. That this is true, must be believed by everyone involved. The speaker looked forward to the day when accidents will be "old fashioned" like many diseases which a generation ago were feared greatly. Many of these sicknesses are now taken care of easily and quickly by modern medical means. "We have outlawed diseases to a large extent, why not outlaw accidents in the same way?" he asked.

Dr. Rankin urged again that his listeners make safety a personal matter. When accidents do occur, he said, there should be no alibi. When accidents continue to occur, it indicates that we lack something in controlling them.

As a physician, Dr. Rankin presented the group with a "prescription" which he described as a preventive medicine against accidents. The ingredients in this prescription include the following: safety consciousness; acting and talking safety; thinking *before* rather than *after* an accident happens. In this regard he pointed out that the penalty for a second's carelessness is frequently a lifetime of regret. Two other ingredients which he mentioned included taking a personal responsibility in safety and training others to do likewise.

Like any other medicine, he said, this prescription will do no good unless it is taken. He suggested that one take enough of it to get the required results, and that the medicine should be taken with one everywhere he goes.

Dr. Rankin pointed out that safety on a 70 or 80% basis is useless. It requires 100% or nothing at all. The reason for this, he said, is that a single life is not a "little." It means everything to the people involved. Therefore an "almost perfect" record is not sufficient.

A panel discussion was conducted by six safety directors, factory superintendents, and production superintendents. With John Smith acting as leader, the following participants were on the panel: Harold B. Krueger, production manager, Snyder Chemical Co., Inc., Topeka, Kansas; R. F. Bennett, president, Farm Fertilizers, Inc., S. Omaha, Nebraska; Ralph E. Fraser, vice-president, Summers Fertilizer Co., Inc., Baltimore, Maryland; Victor L. Cherry, Plant Safety Inspection, Mathieson Chemical Corp., N. Little Rock, Arkansas; W. A. Stone, superintendent, Wilson & Toomer, Jacksonville, Florida; and T. J. Clarke, Personnel Director, G.L.F. Soil Building Service, Ithaca, New York.

Each panel member related an accident history giving details of how it happened and what was done to correct the causes.

Mr. Krueger stated that the very fact that a case history is given, means that something was amiss before the accident happened. His story regarded an employee who was assigned by the foreman to clean up and sweep a conveyer gallery. The job should have taken an hour, but after that time the man had not returned and the foreman investigated.

It turned out that the employee, after completing the work assignment on the gallery, had returned but on the way noticed that pieces of a newspaper had blown under the trunion gear of a drier. In reaching in and attempting to remove the paper, his glove was caught in the gears, dragging his hand into the machinery and amputating four fingers of the right hand.

The question was, should the foreman be blamed in this accident since the workman had carried out his instructed duties but had been hurt in doing a job which he had not been instructed to do? In a question-and-answer period, it was pointed out that it seems unfair to criticize a workman for doing more than he is asked to do, yet it is the responsibility of management to give proper instructions in order to avoid such happenings. The group agreed in its discussion that in this case the workman should have reported back to the foreman and mentioned to him the need for removing paper from the other machine. His initiative was commended but his method was pointed out as being dangerously wrong.

The question arose from the floor whether or not a guard was protecting workmen from these gears. Mr. Krueger replied that there was a guard on the machine but that the workman had reached around it in order to get his hands on the paper. Up to that time this guard which was constructed of metal, had been regarded as adequate; but following the accident a new guard was placed on the machine.

It was pointed out by Mr. Krueger that instructions had been given that no area was to be cleaned while machinery is running. The rule is not to do any type of work while machinery is moving.

It was pointed out that perhaps the safety program is too generalized whereas it needs to be more specific as regards individual effort. Instruction of individuals is a basic need and the points involved must be continually driven home since the men forget or become careless.

It was also pointed out from the floor that this seems to be a case where familiarity bred contempt and the tendency was to "wink" at violations to get the job done.

Electrical Hazards

MR. Stone reported a fatal accident which had occurred in a fertilizer plant recently. This accident was caused when a workman

(*Turn to Page* 91)

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Supplementing previous articles on the subject, Agricultural Chemicals brings its readers information on how revisions during 1953, affected

State Fertilizer Control Laws

by

John D. Conner

Washington, D. C. Attorney

THE 1953 legislative season was one of the most active in recent years, with more than 35,000 bills being placed in the hoppers of forty-four state legislatures. About 15% of these were sent on to enactment. This was the "odd year" in all of its virility.

It seems natural that in this general setting, the fertilizer industry should expect but little repose. When the din of oratorical battle had given way to the less passionate task of engrossment, industry found that it was the object of some legislative concern in twelve states. In four of these; Indiana, Missouri, Rhode Island, and Washington — new comprehensive laws regulating the marketing of fertilizers were passed. Amendments to provisions of existing fertilizer laws were made in eight states: Arkansas, Florida, Idaho, Illinois, Kansas, New Mexico, North Carolina and Wyoming. This compared with new fertilizer controls in three states in 1952 and ten states in 1951.

Fees in Upward Trend

REGISTRATION or tonnage fees were increased in five states in 1953 indicating that the growing trend toward more revenue for regulatory and enforcement purposes is unabated. The idea seems to be that the state should not dip into its general revenues to cover the governmental expenses of a program designed to assure profits to the farmer and an abundant food supply to the consuming public.

The procedure for assessing and collecting these fertilizer fees was either modified or changed in five states. This has been a perennial problem in this field with some states charging flat annual registration fees and others charging on the basis of sales. Most, however, impose both types of fees.

In a previous article it was pointed out that there has been a noticeable trend in recent years toward the abandonment of the tax tag system for the reporting system in collecting tonnage fees. This system was abolished in three states in 1953. In two states, an alternative method of collection was inaugurated under which the reporting system may be used in lieu of tax stamps and tags if specifically permitted by the state control official.

Uniformity Needed

AGAIN the opportunity may be taken to stress the practical need for greater uniformity in the state laws which regulate the marketing of fertilizers and other products used in agricultural production. Much has been accomplished in this vein due largely to the foresight and energetic effort of those who recognize the boomerang effects of legislative trade barriers in the national distribution of agricultural supplies. The field is yet fertile, however, for greater strides for uniformity in labeling, registration procedures and methods of assessing and collecting fees.

The summary of the 1953 revisions to fertilizer laws, outlined below, covers principally the scope, labeling requirements and fee provisions of these revisions in keeping with the form of the original summary started in 1951:

Arkansas

TWO amendments to the Arkansas fertilizer law were made. One amendment increases the tonnage tax on commercial fertilizer from 12½ cents per ton to 24 cents per ton and provides for a method of allocating the fees (H. 398 approved March 23, 1953). The other amendment provides that information with respect to the analysis of components may be placed on the invoice of sale rather than on the container itself in the sale of anhydrous ammonia and other fertilizers in bulk (S. 190 approved March 5, 1953).

Florida

AN amendment made to the basic fertilizer law in Florida establishes a new system for making tonnage reports (H. 832 effective July 1, 1953). Under this amendment, application may be made to the Commission of Agriculture for a permit to report tonnage sales in lieu of the established method of using taxes or stamps. If the permit is granted, a tonnage report must be submitted and inspection fee paid before the 25th day of each month.

Idaho

THE requirement that the total phosphoric acid and source thereof appear on the labeling of fertilizers has been eliminated under a recent amendment to the Idaho law (H. 175, approved March 3,

1953). The amendment also establishes a "Commercial Fee and Fertilizer Fund" in the place of the old "Experimental Fertilizer Fund" as the depository for fees collected under the fertilizer law.

Illinois

MINOR amendments to the penalty section of the Illinois fertilizer law have been made, including an increase in the minimum fine for a violation from $50 to $100 (H. 674, approved July 6, 1953).

Indiana

INDIANA now has a new comprehensive fertilizer law to be known as the "Commercial Fertilizer Law of 1953" (H. 65 effective July 1, 1953).

Scope: The law applies to any substance containing nitrogen, phosphoric acid, phosphorus or any recognized plant food used primarily for its plant food content or for compounding mixed fertilizers. Unmanipulated animal and vegetable manures are excepted. Commercial fertilizers are defined as mixed fertilizer and/or fertilizer material, except non-processed barnyard manure, marl, lime, wood ashes and plaster.

Registration Fees: The annual registration fee is $5 for each grade. Registration expires on June 30 of each year.

Tonnage Reports and Fees: In addition, an inspection fee for packages of more than 5 pounds is imposed at the rate of 25¢ per ton. Payment of the fee may be evidenced by official tags or labels issued by the State Chemist or may be made on the basis of quarterly tonnage reports if a permit is applied for and granted. In the case of packages of 5 pounds or less, the fee is $25 for each grade with no requirement for tonnage tags or reports.

Labeling Requirements: In addition to a statement as to weight, brand and maker, labels must show the guaranteed analysis. The analysis must state the minimum percentages of plant food claimed in the following order and form: "Total nitrogen——— per cent; Available phosphoric acid (P_2O_5)——— per cent; Soluble potash (K_2O) ——— per cent."

Unacidulated mineral phosphatic materials and basic slag must be guaranteed as to both total and available phosphoric acid and the degree of fineness. In the case of bone, tankage, and other natural organic phosphate materials, only the total phosphoric acid need be guaranteed.

Additional plant food elements or other additives may be guaranteed only by permission of the State Chemist.

Kansas

A NEW law in Kansas authorizes the State Board of Agriculture to issue regulations governing the handling, storage, and transportation of liquid fertilizer. An advisory committee including manufacturers of liquid fertilizer is created to advise the board in the preparation of these regulations (H. 95, approved April 3, 1953).

Missouri

SUBSTANTIAL amendments have been made to the Missouri fertilizer law with respect to coverage, labeling, tonnage reports and fees (H. 261, approved May 25, 1953).

Scope: Fertilizers are now specifically defined to include "any substance containing nitrogen, phosphorus, potassium, or any other element or compound recognized as essential or used for promoting plant growth, or altering plant composition, which is sold or used primarily for its plant nutrient content, the consumer's purchase price of which exceeds $10."

Registration Fees: There are no registration fees. An annual permit to sell must be obtained from the Director of the Missouri Agricultural Experiment Station, the permit expiring on June 30 of each year.

Tonnage Reports and Fees: Tags and tag fees are abolished in favor of a tonnage tax and reports. The tonnage tax is 1½¢ per 100 pounds sold. The tax is based upon semi-annual reports which must be filed within 30 days after June 30 and December 31 of each year.

Labeling: The new law makes no reference to the labeling of compositions expressed in equivalent to ammonia. New provision is made requiring the guaranteeing of unacidulated mineral phosphatic materials and basic slag as to both total and available phosphoric acid and the degree of fineness. Also, in the case of bone, tankage, and other natural organic phosphate materials, only total phosphoric acid need be guaranteed.

New Mexico

A NEW system for assessing and collecting fees under the New Mexico fertilizer laws is now in effect under an amendment passed this year (S. 244, approved March 20, 1953).

Tax stamps or tags are eliminated and replaced by quarterly reports. The tonnage fee, now called the "inspection fee", is 25¢ per ton and is based on quarterly tonnage reports made in January, April, July and October of each year. Exempted from this tonnage fee and reporting requirements are sales of packages of 5 pounds or less or bottles of one quart or less. As to sales made in these quantities, a flat annual fee of $10 is imposed.

North Carolina

A NEW law regulating the storage, handling and distribution of liquid fertilizer is now in force in North Carolina. Among other things, the law requires that all liquid fertilizers must be registered before sale in the state.

Rhode Island

RHODE Island has a new, comprehensive law to be known as the "Rhode Island Fertilizer Act of 1953" (H. 624, effective January 1, 1954).

Scope: The law applies to any substance containing nitrogen, phosphoric acid, potash, or any recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizers. Exempt are animal manures that have not been dried or otherwise artificially

(*Turn to Page 123*)

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Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

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DILUENTS AND GRINDING AIDS

WASHINGTON *Report*

by
Donald G. Lerch, Jr.
Cornwell, Inc., Washington, D. C.

WITH several key farm state Congressmen already making moves to block Secretary Benson's reorganization of the U. S. Department of Agriculture, no fast shift of the personnel at the working levels is expected. That's the majority view of old-line government men who bear many scars from the almost continuous shakeups that have occurred even when no change of Administration was a factor.

Center of protest is the Soil Conservation Service Regional offices. Many conservation men just don't feel they can do an effective job from a college campus. Particularly when SCS and state extension service policies often clash. That's why some top officials are resigning in a hurry. Congress is sure to launch heavy attacks against this disturbance of conservation.

The fate of entomological work is somewhat obscured by the conservation storm. For one thing, entomology is not politically popular and at this writing not an important issue in the minds of Congressmen.

Secondly, moves to modify the semi-secret reorganization plan for BEPQ are being made behind closed doors. Industry representatives are criticizing sharply the Department's policy of not releasing more information to groups affected. The Department excuse is that "all has not been decided." However, an estimated 2,000 USDA employees were given a "camera talk" on the new research plans for the Department with the organization charts being flashed on a screen.

* * *

Most of the "hard core" of BEPQ is to find its way to a new box as part of a crop research organization headed by a deputy director, probably answering to Byron Shaw, well-known research head for the Department. Dr. Shaw is to head one of the six main groups reporting to Earl Coke, Assistant Secretary and director of the new Federal-State Relations.

Dr. Shaw's other arm will be concerned with control and regulatory work. Consequently, the regulatory phase of entomology (including quarantine work) is to find its new home among the sub-divisions concerned with crops. Added to this will be the administration of the Federal Insecticide Act headed by W. G. Reed.

Work on insects affecting forests is scheduled to go to the Forest Service also answering to Mr. Coke. Battles over this phase have been raging for years.

The National Agricultural Chemicals Association believes serious consideration should be given proposals advanced by several experiment stations that a more consolidated pest control setup be established on the research side of Dr. Shaw's operations. Primarily, such an organization would include research on entomology, nematology and plant diseases. This would give industry and scientists outside the government a central point at which to deal. It appears that support for this type of organization is growing.

* * *

Of course, many questions about the reorganization are still unanswered: Administration officials say that with the exception of the very top levels of organization, changes can still be made. Apparently even after the big shuffle takes place, opportunity to make adjustments will still be available.

Both the pesticide and fertilizer requirements officials, formerly in the Office of Materials and Facilities, are slated to be housed in the Mobilization Activities Division as part of the Agricultural Stabilization Service. This is to be a completely separate part of the Department under another Assistant Secretary.

Most of the agronomists working with fertilizers are to be moved to a Soil and Water Conservation unit as part of the Farm Management and Land Use organization of Dr. Shaw's research setup. In this same category are to be the economists dealing with fertilizer statistics in a unit called Production Economics. As such, these phases of fertilizer work would be more centralized than before.

* * *

For the first time since the war, potash is actively looking for markets. The potash position has changed from one of stretching available supplies to increasing farm usage. Dr. Harvey B. Mann, president of the American Potash Institute, Inc., is launching a two-point program to stimulate potash sales. The first is centered on research. Although the Institute has long maintained an outstanding research organization, it will now be further expanded to include more agronomists and other specially trained men. Research is considered the core of the development program.

Second part is an information and promotion program aimed primarily at farmers. The feeling is that many important facts on the farm potash performance are not fully appreciated. When more farmers recognize the dollar returns to be expected from potash in balance with other plant foods, it is believed that consumption will increase. Evidences of this program are expected to be seen shortly.

* * *

Since the last normal pre-war year, 1938, production of K_2O equivalent has increased nearly 6 times,

through 1952. Last year North American deliveries exceeded 3 million tons of salts.

This great increase is largely the result of increased productiveness of the mines and improved refining equipment. Tremendous amounts of private capital have been invested to bring about these improvements. Also, several new companies have entered the field.

The industry is confident that the expanding needs of agriculture will provide markets for this increased production capacity. Big area for further development is in the midwest where potash is, in effect, just "catching on." Iowa, Illinois, Minnesota, Wisconsin and Missouri show tremendous increases in consumption compared to pre-war.

Since most of the potash is sold in the form of mixed goods, the fortunes of the potash industry are closely tied with the fertilizer industry in general. The potash group wants to make sure farmers know they are making a profitable investment when they buy fertilizer with a big number on the end of the analysis tag.

* * *

Iowa has replaced Illinois as the top lime consuming state, taking first place after Illinois held its position for 17 consecutive years. Total lime consumption appears to be suffering only a slight decline this year according to Robert S. Boynton, General Manager of the National Lime Association. Consumption has held reasonably steady for the past four years.

He feels that farm use of lime is far from its potential and that the industry can expect gradual increases for many years. The lag in demand compared to plant food materials, he believes is because lime does not usually produce spectacular results. The steady increase in fertilizer consumption however, is creating a broader demand for lime, he says, as more farmers see that further increases in yield are dependent to a large extent on the use of more lime.

* * *

NAC's Annual Spring meeting will be held in the Shamrock Hotel, Houston, Texas, March 24-26. The decision to hold a meeting for all members of the Association followed considerable discussion that a series of smaller regional meetings was preferable.

However, in view of the many problems facing the industry, it was concluded that a national meeting would achieve better results. This will be the first time the Association has met in Texas. Speakers and other program details are yet to be determined.

* * *

Latest statement on the necessity for choosing between insects and safe residues was made by Dr. Charles L. Smith, Ethyl Corporation, speaking for the legislative committee of NAC during the recent meeting of the Association of Pesticide Control officials.

Stating that the pressure to clean up stored grain made seizures imminent, Smith listed two choices. "Either we must eat foods contaminated by rodents or insects, or we must devise a sanitation program through use of chemicals and, if necessary, allow in our foods a minimum amount of residues which would be harmless in our everyday diet," Smith said.

* * *

Lateness of the season will make it difficult for many fruit and vegetable growers to comply with still unissued at time of writing residue tolerances. Those growers on the West Coast and in the South may find it hard to make possible changes in spray schedules in time to comply with new regulations when they become effective.

Farm organizations continue to ask why the tolerances have not been issued long ago. They feel that the educational problems resulting from the years of delay have been made unnecessarily difficult. Farm and grower groups emphasized during the Food and Drug hearing that ample time should be allowed between the date tolerances are issued and the time they become effective. Under most conditions this means before the beginning of the new growing season.

Growers who are already suffering from a cost-price squeeze are not keen about being caught in a time squeeze.

* * *

International interest is being shown in coined names for pesticides. At the request of the British Standards Committee, the International Organization for Standardization has contacted U. S. officials with proposals for closer working relationships.

In the U. S., the Interdepartmental Committee on Pest Control comprised of representatives of Agriculture, Interior, Army, Navy, Air Force and Federal Security Agency acts on applications for the establishment of coined names. Chairman is Dr. S. W. Simmons, U. S. Public Health Service who succeeded Dr. H. L. Haller, BEPQ.

There is some feeling that an international approach will result in a clearer understanding of what is meant by coined names and their use will therefore increase.

•

ESA Program For December

Final plans have been made for the first annual meeting of the new Entomological Society of America at Los Angeles, Calif., December 7-10. Headquarters for the convention will be the Biltmore Hotel.

Dr. Ernest N. Cory, College Park, Md., secretary of the ESA, has announced that the program will include speakers of national prominence and subjects to be discussed are to cover chemicals for insect control, legislation, biological control of agricultural pests and physiological aspects of entomology.

Dr. Charles E. Palm, head, Department of Entomology, Cornell University, Ithaca, N. Y., president of the ESA, will open the program with his address, followed by a business meeting. The afternoon will be devoted to sectional meetings.

On Tuesday and Wednesday mornings, a special program of invitational papers has been set up. Included on the program are:

Dr. George C. Decker, Illinois Natural History Survey, Urbana, Ill., "The Role of Insects in the Economic Future of Man"; and Avery S. Hoyt, chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C., "The Role of Man in the Future of Insects."

Continuing the program, Dr. Roy Hansberry, Shell Chemical Corp., Modesto, Calif., will speak on "The Role of Chemicals in the Future of Insects" and Lea S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, D. C., on "The Role of Legislation in the Future of Entomology."

Ammonia Institute Meets in St. Louis

A RECORD attendance of 500 persons was expected at the third annual meeting of the Agricultural Ammonia Institute, planned to be held November 16, 17, and 18 at the Chase Hotel, St. Louis. The convention program was developed around the operational problems of the industry, and a trade show with some 34 exhibits booths was also planned as an attraction. Exhibits will be in the hotel, and also space in the hotel's garage was arranged for the showing of heavy equipment.

The first day of the three day event is devoted to a board of directors meeting at 9:30 a. m., with an afternoon session of committee meetings and other business. That evening, a preview of the trade show is scheduled. Registration also will be carried on during the afternoon.

The trade show will be open on Tuesday morning, November 17 (for admission by badge only), and in the afternoon the regular program sessions begin. Jeff I. Davis, Jr., Southeastern Liquid Fertilizer Co., Albany, Ga., president of the AAI, will report on progress made by the agricultural ammonia industry during the past year.

Other events on Tuesday afternoon will include a talk by C.J. Bown, sales manager, Grace Chemical Co., Memphia, on "Trends in the Agricultural Ammonia Industry"; and a panel discussion on safety, moderated by Allen Brown of Ed Nelson, Ltd., Clarksdale, Miss. Panel men will be M. L. Blair, chief inspector, state of Arkansas; Norman LeBlanc, Henry Valve Co., Chicago; E. W. Thomas, Farm Service Co., Booneville, Mo.; and Raymond Engel, Schrock Fertilizer Service, Congerville, Ill. A business session and the trade show will fill out the day.

Wednesday morning will allow more time for visiting the exhibits, and the program will resume Wednesday afternoon. Mel Trotter, president of the National Liquid Petroleum Gas Assn., will speak on organizational management, and Paul Cory, sales manager, Moorman Mfg. Co., Quincy, Ill., will discuss "Selling". John D. Selim, research coordinator, The Weatherbird Co., Cleveland, will discuss "Problems Encountered in the Controlled Dispensing of NH_3." A panel discussion on "Program Development" will be held, with Wayne Peck, Phillips Chemical Co., as moderator. Participants in this panel will be Fred Douglas, Suburban Farm Service, Whippany, N. J.; Robert L. Tilton, Edward J. Funk & Sons, Kentland, Ind.; Charles Bourg of PV-82, Lincoln, Nebr.; and Gen. Ralph H. Wooten, Mid-South Chemical Co., Memphis.

The annual banquet and entertainment is to be held Wednesday evening.

•

Moore to Sprout-Waldron Co.

A. PARK MOORE

Appointment of A. Park Moore as sales representative for Sprout, Waldron & Company, Inc., in the Philadelphia-Wilmington area has been announced by Harold J. Alsted, vice-president in charge of sales.

A graduate of the University of Pennsylvania, Mr. Moore has been with E. I. du Pont de Nemours & Company, Wilmington, Delaware for the past 11 years. During the first five years he was in the engineering department and for the last six, in the purchasing department as field purchasing agent supervising sub-contracting in the New York area for the A. E. C. program.

In his new capacity, Mr. Moore will be calling on the chemical and allied processing industries representing Sprout-Waldron, manufacturers of process machinery and bulk materials handling equipment.

•

Dairy Industries to Meet

A World Congress for Milk Utilization is scheduled to be held at the Statler Hotel, Washington, D. C., November 20 and 21. Sponsored by the Dairy Industries Society, Washington, the program is built around the problems involved in achieving better utilization for world milk supplies.

Senator Alexander Wiley, Wisconsin, Chairman of the Senate Foreign Relations Committee, has been named honorary chairman of the Milk Congress. In a statement made recently in connection with the forthcoming Congress, he declared that two-thirds of the people of the world have either no milk products or far too little of them. "Yet, the remaining third actually has a surplus of some milk products," he said. "We must solve this paradox. The nations with surpluses must help meet the needs of other countries with severe shortages."

Speakers, billed as "world leaders", will discuss production and distribution of dairy products.

•

MH-40 for Quack Grass

According to tests made at the University of Wisconsin, quack grass can be chemically controlled with maleic hydrazide. The chemical is a growth regulator developed by the Naugatuck Chemical division, U. S. Rubber Co., New York, and sold nationally in 40 per cent concentration as MH-40.

Treated land may be planted within a few days after application. MH-40 has caused no noticeable soil toxicity, and had no effect on the crops planted in the treated areas. To date, snap beans, sweet and field corn, soybeans, sorghum, buckwheat, red beets and sun flowers have been tested, and there has been no reduction in germination.

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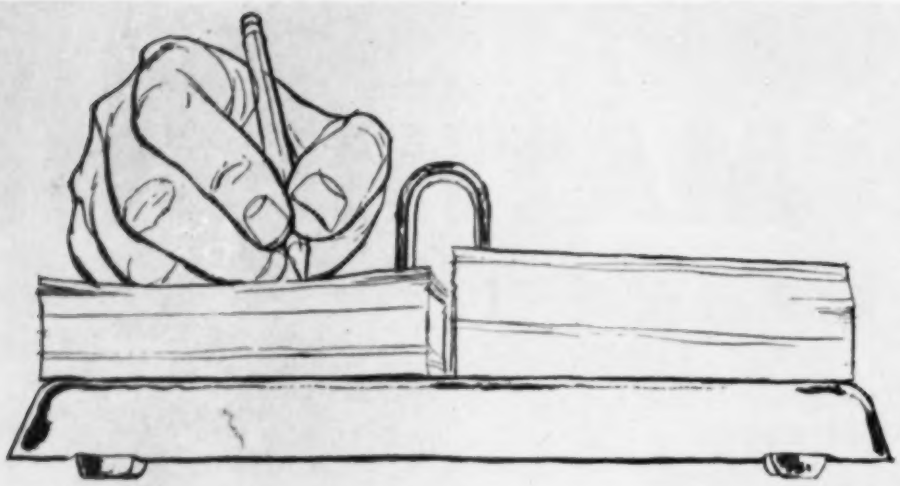

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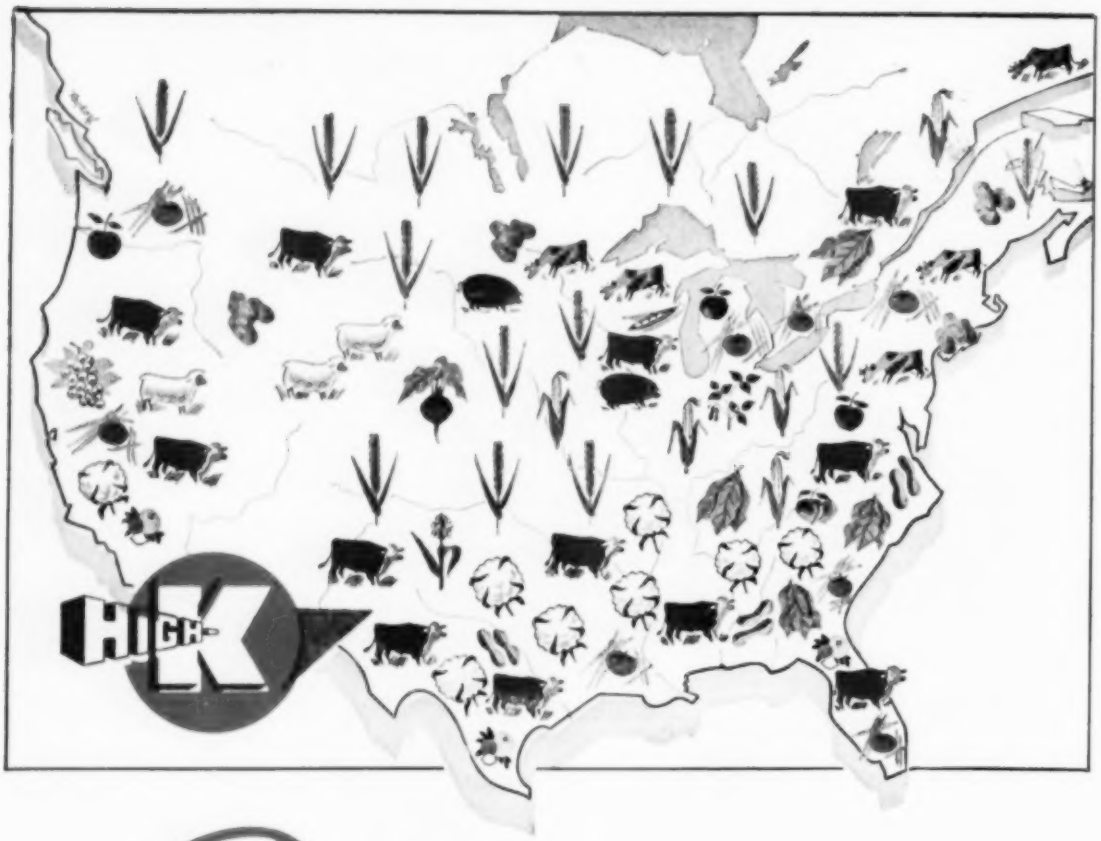

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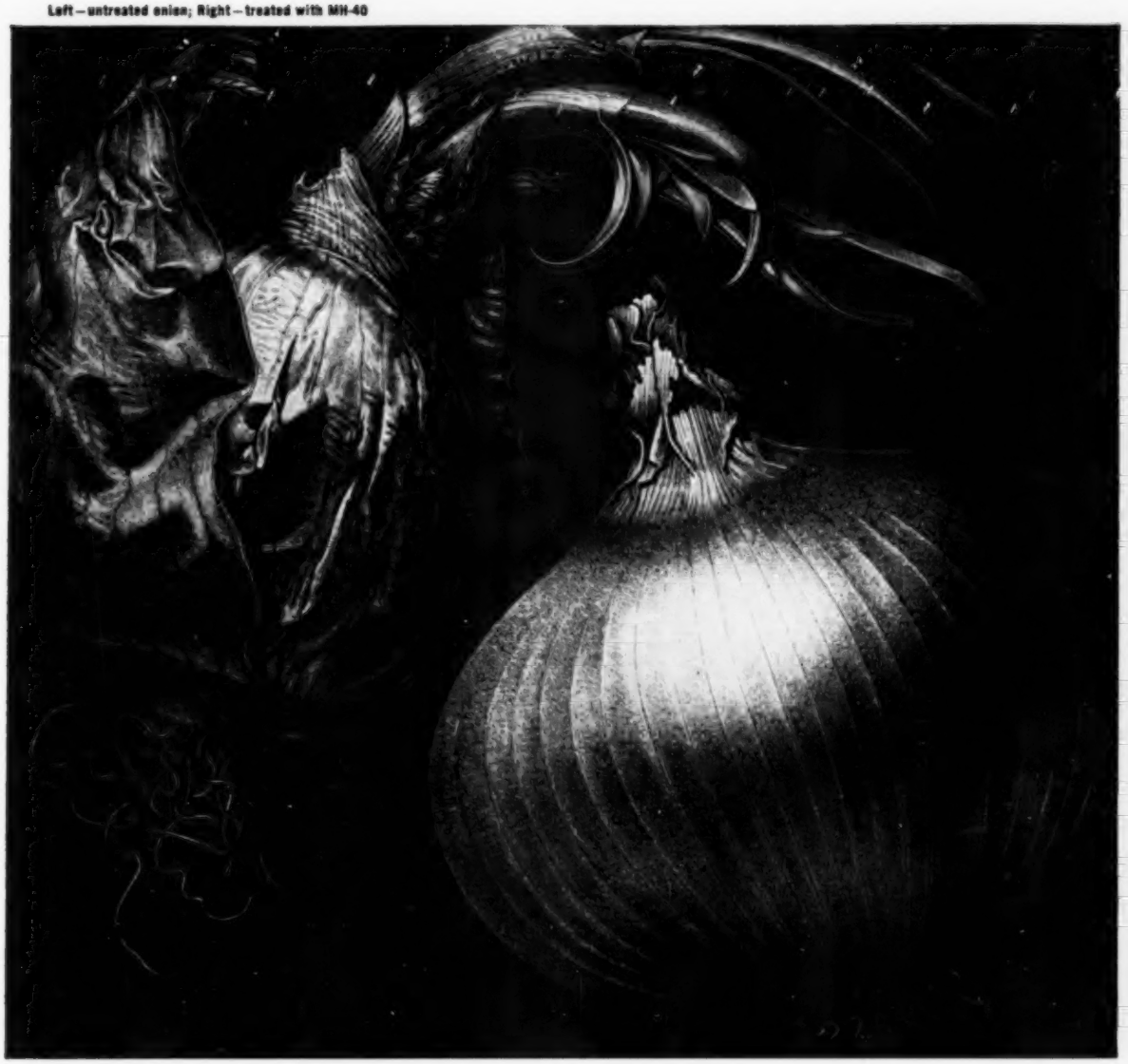
Left—untreated onion; Right—treated with MH-40



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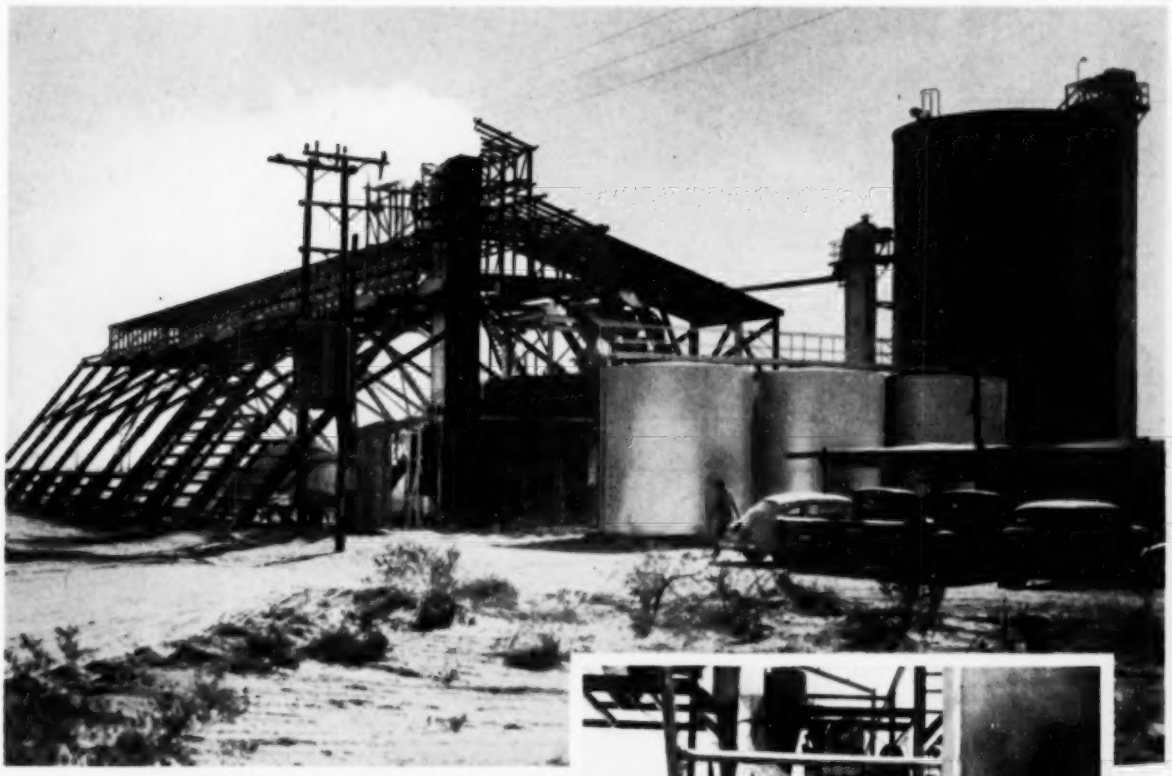

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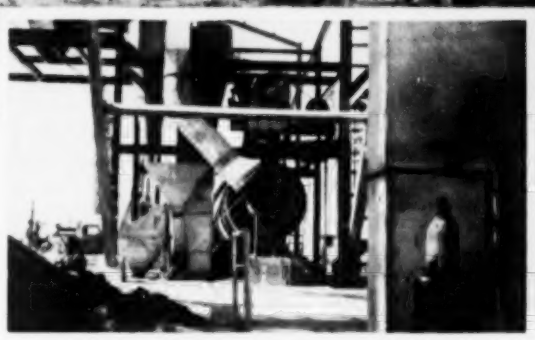

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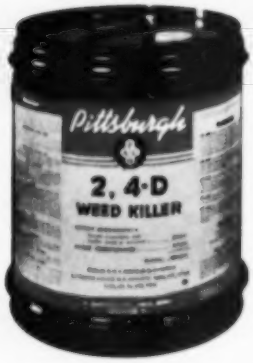

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FUNGICIDES, SEED DISINFECTANTS, COTTON SPRAYS AND DUSTS, AND OTHER SPECIAL AGRICULTURAL CHEMICALS.

A DIVISION OF

PITTSBURGH
COKE & CHEMICAL CO.

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AMMONIUM SULPHATE NITRATE

26% NITROGEN

supplies the 2 key forms of nitrogen

Contains 6½% nitrate nitrogen — quick acting for early, vigorous growth. Contains 19½% ammonia nitrogen — slower acting for sustained growth through to harvest time.

easy to use

Pelletized and properly sized for flow. Easy to handle, ready to use for top dressing, side dressing and irrigation.

now available

F.O.B. all regular Atlantic and Gulf ports, shipped to the trade in even-weight bags. Write us today for a sample and further information.

Sole Distributors for
RUHR-STICKSTOFF AKTIENGESELLSCHAFT
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Branch Offices:
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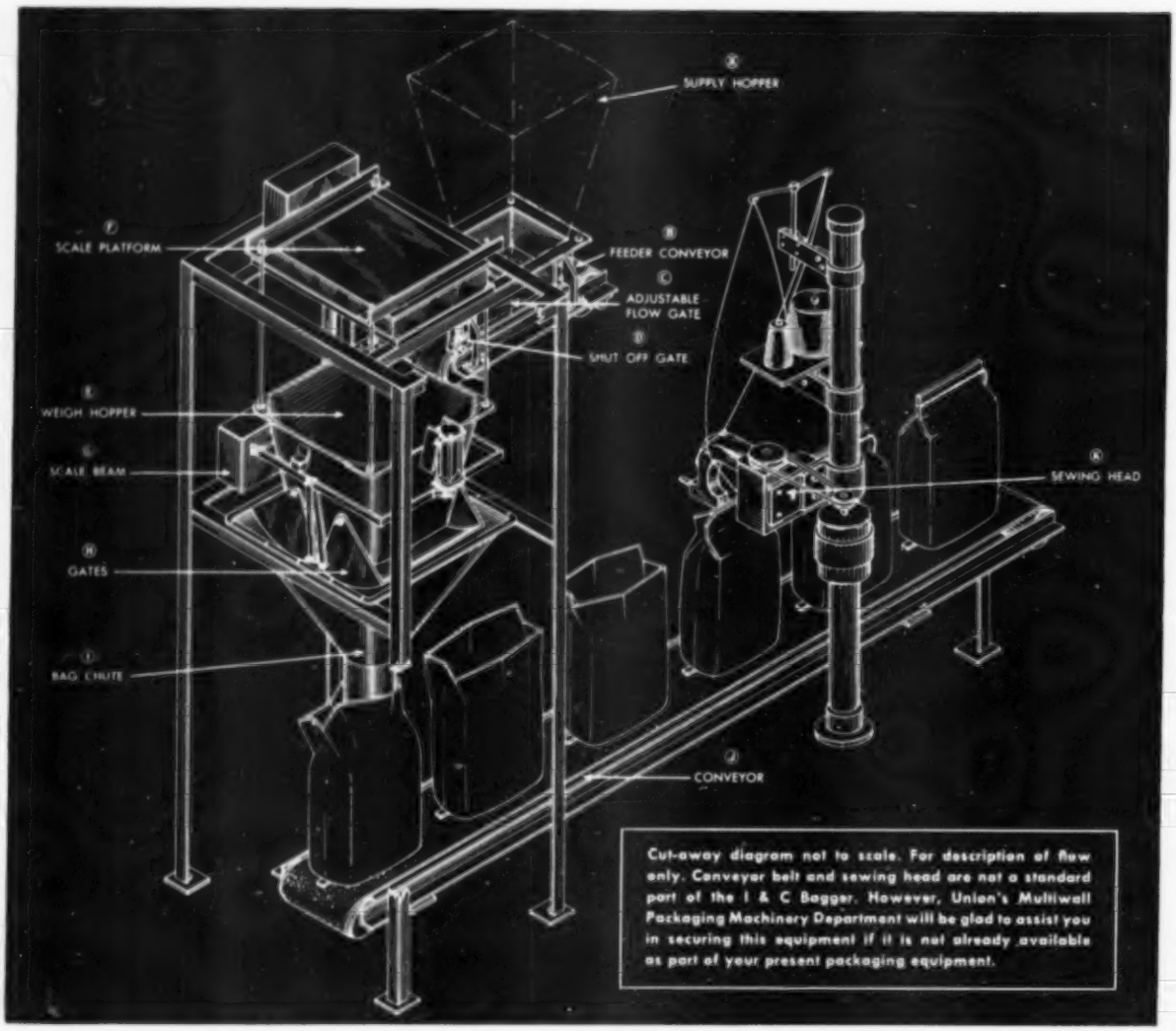


OPERATION IS SIMPLE AND PRACTICALLY FOOL-PROOF

MATERIAL to be packaged flows from supply hopper (A) to feeder conveyor (B) which carries material to weigh hopper (E). Adjustable flow gate [located at (C) but not shown] regulates amount of material which feeder conveyor carries. This controls speed of filling cycle.

Weigh hopper (E) is suspended from scale platform (F). When material fed into weigh hopper reaches weight set on scale, the scale platform actuates scale beam located in box (G).

Scale beam sets off a system of synchronized switches which stop the feeder conveyor (B), lower a shut off gate [located at (D) but not shown] on the weigh hopper end of the feeder conveyor. This prevents any excess material from dribbling into weigh hopper, insuring accurate weight. Switch also opens gates (H) at bottom of weigh hopper. Pre-weighed material drops through filling spout (I) into bag.

With weight removed from scale, scale beam (G) now actuates synchronized switches in reverse order. Simultaneously gates (H) to weigh hopper (E) close . . . shut off gate (D) raises . . . and feeder conveyor (B) starts up and begins next filling cycle.

Bag is held on filling spout (I) by hand. As material drops quickly through spout into bag, filled bag drops onto a moving conveyor belt (J). This belt carries bag through sewing head (K) to complete packaging cycle.

I&C Bagger

Automatic Weighing and Filling Machine for Open Mouth Bags

FASTEST AUTOMATIC BAGGER

MUCH-DISCUSSED I & C BAGGER WEIGHS AND PACKS FREE-FLOWING, NON-BRIDGING MATERIALS AT SPEEDS UP TO 20 100-LB. MULTIWALLS A MINUTE!

DOLLAR FOR DOLLAR, the new Inglett & Corley Bagger, sold exclusively by Union Bag, is the most efficient and practical unit for accurate, high speed weighing and packing of free-flowing, non-bridging materials.

The I & C Bagger processes 400 to 500 tons in an eight hour day. Its filling and weighing cycle is completely automatic. Weight tolerance is close: in continuous runs, the machine can and does pack to within 4 ounces per 100 lb. bag.

LOWEST COST AUTOMATIC OPEN MOUTH BAGGER

Total cost of the I & C Bagger, with conveyor and sewing head, is more than 25 per cent below any comparable unit, and the I & C has a packing rate 25 per cent greater than any other open mouth packer.

WORKS WELL WITH ALL SIZES OF OPEN MOUTH BAGS

Changeover from one weight to another takes only the few minutes needed to change the scale beam balance. The I & C Bagger handles any open mouth bag, paper or textile, from 10 through 200 lb. weights.

NEEDS ONLY TWO OPERATORS

The I & C Bagger pre-weighs and packs with only one operator plus another man on the sewing equipment. Unskilled labor can be used; men require a minimum of training and supervision.

INSTALLED AND OPERATING IN TWO DAYS OR LESS!

Only 5′ x 5′ floor space, 8′ headroom over conveyor needed. Factory trained personnel will make installation, if desired, at actual cost.

DELIVERY PRIORITIES BASED ON RECEIPT OF ORDER

For quickest possible delivery, consult a Union Packaging Specialist now. Union can also advise you on plant layout and on whatever supplementary packaging machinery you may require.

HIGHER PRODUCTION...
LOWER COSTS...
LESS DOWN TIME...

Ask to see the impressive performance records the new I & C Bagger already has established in daily field use. Production jumps. Labor costs drop sharply. Down time is slashed.

Make your own comparison with any other packer. Verify for yourself that Union's I & C Bagger is more economical initially—cheaper to install—less expensive to maintain.

Manufactured by
INGLETT & CORLEY, INC., AUGUSTA, GA.
Exclusive sales agents:

Union Bag & Paper Corporation

Woolworth Building, New York 7, N. Y.

MULTIWALL PACKAGING MACHINERY DEPARTMENT

The American Agricultural Chemical Co.

. . . with new type pulverizer at

American Agricultural Chemical Co. Grinding Plant—Pierce, Fla.

To meet a large increase in demand for ground phosphate rock, The American Agricultural Chemical Co. found it necessary to increase the grinding facilities of their Pierce, Fla. operations. After a careful study of available systems, the Kennedy Air Swept Ball Mill System was chosen as the one best suited to grind pebble, concentrate, or a combination of both at the lowest cost. Dependability, continuity of operation, low power, maintenance, and operating labor costs were the prime factors in their decision.

The ball mill has long been used in many industries where continuous production with minimum maintenance and operating supervision is required to keep production costs to an absolute minimum. The simplicity of the ball mill, both in design and operation, makes it the ideal pulverizer.

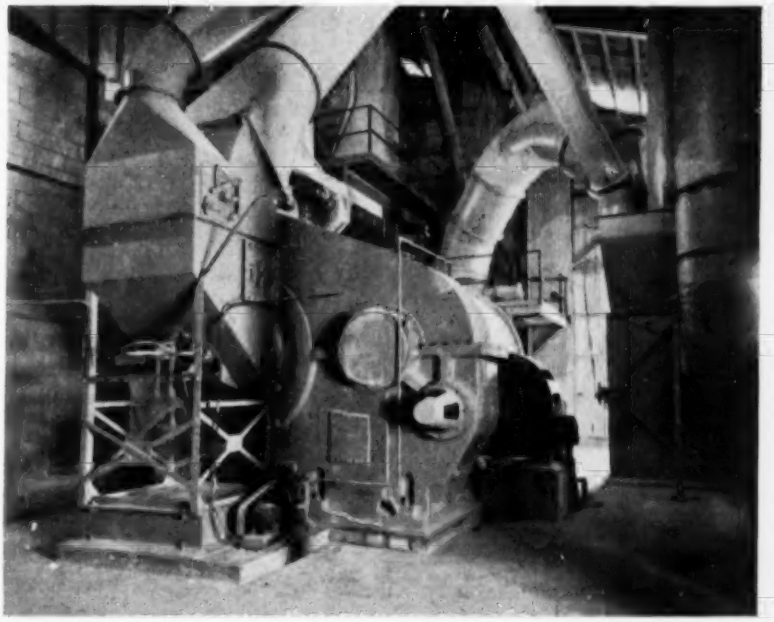
The Kennedy-Van Saun Air Swept Ball Mill Grinding System is the ultimate in Ball Mill Systems. The Kennedy Radical Flow classifier makes possible production of a wide range of product sizes, by positive external adjustments, to a high degree of accuracy.

Kennedy-Van Saun 11' Radical Flow Classifier and Cyclone collectors.

Send for free bulletin and technical data describing this equipment

increases ground phosphate rock production

Pierce, Florida plant!



Kennedy-VanSaun 10′ x 15′ Integral Gear Drive Air Swept Ball Tube Mill and #93 Exhauster Fan.

OUTSTANDING FEATURES

- ***lower maintenance***

  Tramp iron, manganese, and other foreign material cannot damage system. *No magnetic separation required.*

  Grinding balls added while mill is in operation, maintaining constant level of grinding media. Production and fineness remain constant, month after month. No periodic shut-down for lubrication or replacement of wearing parts. Years of operation assured before parts (other than grinding balls) require replacement.

- ***minimum power***

- ***lower operating Cost***

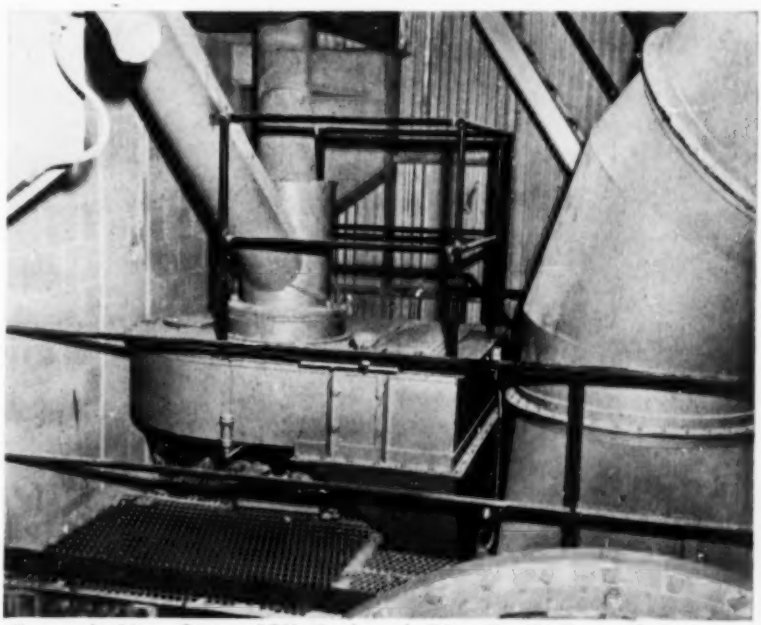
  Dependability of equipment and reliable automatic feed control assure high production with minimum operating personnel.

- ***higher production***

  Single grinding unit capacities to 75 tons per hour, requiring less floor space and structural work per ton of production.

- ***flexibility of Design***

  Kennedy-Van Saun Air Swept Ball Mill Grinding Systems available in a wide range of capacities to meet your requirements.



Kennedy-Van Saun 60" Enclosed Disc Feeder

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY-VAN SAUN
MANUFACTURING & ENGINEERING CORPORATION
TWO PARK AVENUE, NEW YORK
***FACTORY* DANVILLE, PA.**

for correction of mineral deficiencies...

It's been an impressive beginning, this correction of iron deficiency in Florida citrus. Consider, trees have been restored to full vigor and yields increased by 5 to 10 times in severe cases of deficiency.

The significance? Applications of Sequestrene iron complex *have* corrected one of the most difficult deficiencies to cure, but in addition this complex has emphasized the prospects of the other Sequestrene metal complexes. These complexes are being field tested on such crops as peaches, pears, cherries and vegetables as well as field, pasture and forage crops and various flowers. Thus, the more efficient and effective method of treating plant deficiencies may be very close at hand.

Experimental quantities of Sequestrene in combination with iron, zinc, copper, manganese, and calcium are available to qualified applicators upon request.

*"SEQUESTRENE" is the brand name for chelating compounds produced by Alrose Chemical Company, a Geigy Company.

Geigy

ORIGINATORS OF DDT INSECTICIDES

GEIGY COMPANY, INC. • 89 BARCLAY STREET • NEW YORK 8, N. Y.

GEIGY COMPANY, INC. ARE THE EXCLUSIVE SALES AGENTS FOR SEQUESTRENE METAL COMPLEXES IN THE AGRICULTURAL FIELD.

AS WE GO TO PRESS . . .

Eastern Branch, ESA, to Philadelphia

PHILADELPHIA'S Bellevue Stratford was the locale of the annual meeting of the Eastern Branch of the Entomological Society of America, scheduled for November 16 & 17. Some sixty technical papers were on the agenda for presentation during the two-day convention.

Presiding at the opening session, according to the advance program, was Dr. P. J. Chapman, Cornell University, chairman of the Branch. Among the persons scheduled for the morning's program were the following: Dr. C. E. Palm, Cornell University, president, Entomological Society of America; Dr. E. N. Cory, College Park, Md., who was to comment on the consolidation of the American Association of Economic Entomologists and the old Entomological Society of America; Ashley B. Gurney, "Recent Activities with Respect to the Common Names of Insects"; and John G. Matthysse, Cornell University, "Cattle Ticks, Associated Diseases, and Control in Central Africa."

Dr. Harry G. Walker, Pennsylvania Salt Mfg. Co., Philadelphia, was to be chairman of one afternoon session; S. W. Frost, of another and Dr. Matthysse of a third, all running concurrently Monday afternoon. Papers scheduled for presentation at Dr. Walker's session include: "Control of DDT-Resistant Potato Flea Beetles in Connecticut," by James B. Kring, New Haven; "Effectiveness of DDT for Cabbage Worm Control," by G. E. R. Hervey and K. G. Swenson, Geneva, N. Y.; "Insecticidal Reduction of Virus Spread in Peas" by L. P. Ditman and Charles Rosenberger, College Park, Md.; and "Insecticide Tests for Tobacco Flea Beetle Control," by C. B. Dominick, Chatham, Va.

The section under the chairmanship of Dr. Frost was to include papers on insect physiology and biology, while Dr. Matthysse was to lead an informal discussion on Control of Ornamental Crop Pests.

An evening symposium was planned for 8 p.m. Monday, to cover genetics in entomology, hybridization and pesticide resistance, with Dr. H. H. Schwardt, Cornell, as moderator. Taking part in the discussion are Dr. R. I. Sailer, B.E.P.Q., Washington, D. C.; Dr. Lloyd E. Rozeboom, Johns Hopkins University, Baltimore, Md.; Dr. James C. King, Cold Spring Harbor, N. Y.; Dr. Floyd F. Smith, B.E.P.Q., Beltsville, Md.; Dr. James F. Crow, University of Wisconsin, Madison; and Dr. Schwardt.

Dr. Chapman and L. M. Roth are in charge of Tuesday morning's concurrent sessions, each of which was to feature a number of technical papers.

Among those scheduled for delivery at Dr. Chapman's session, were: "A Survey of DDT Accumulation in Soils in Relation to Different Crops," by J. M. Ginsburg and J. P. Reed; "Evaluation of Truck Sprays Against Peach Tree Borers," by Donald McCreary, Univ. of Delaware; and "Parathion Residues on Peach Bark and Foliage," by Marvin L. Bobb, Piedmont Fruit Research Laboratory, Charlottesville, Va. Papers on the agenda for Dr. Roth's section included a number on insect physiology.

A final business session was set for Tuesday afternoon under the chairmanship of Dr. Chapman, followed by a number of technical papers including "Phytotoxicity of Insecticides in Mist Concentrate Type Formulations" by Dan Clower and Dr. Matthysse, Cornell; and "Persistance of Lindane-Chlorinated Terphenyl Insecticidal Residues on Outdoor Foliage," by Irwin Hornstein, W. W. Sullivan, Ching Tsao and A. H. Yeomans, U.S.D.A., Beltsville, Md.

•

Zipse, Hodgson, Leave Geigy

Robert J. Zipse, sales manager of the Agricultural Chemicals Division of Geigy Co., Inc., has announced his resignation from the company. R. H. Hodson, assistant sales manager of the Division, has likewise resigned. Neither had announced his future plans as we went to press.

•

Becomes V-C Division

Tobacco By-Products and Chemical Corporation, formerly a wholly-owned subsidiary of Virginia-Carolina Chemical Corporation, has been dissolved as a separate corporation and absorbed as the "Black Leaf Products Division" of the parent company.

In making the announcement, Joseph A. Howell, V-C president, said that the company will continue to market pest control products under the "Black Leaf" trademark, with production and sales operations being merged with those of V-C.

C. Bruce Rennie will continue to direct the insecticide activities of the firm as general manager of the new division. James R. Arthur will serve as assistant to general manager; James W. Schofield, manager, production department; James M. Merritt, sales manager; and Arthur W. Galloway, manager, products development.

Virginia-Carolina Chemical Corporation became sole owner of the Louisville, Kentucky, firm on December 31, 1947, having been majority stockholder since 1919.

Ithaca Pesticide Conference Under Way

NEW York State's fifteenth annual Insecticide and Fungicide Conference was being held at Cornell University, Ithaca, N. Y., as we went to press. The three-day meeting, beginning November 10, was to include the sixth annual Pesticide Application Equipment Conference in connection with the chemical section.

Professor O. C. French, Cornell, was to be chairman of the opening session at which papers were to be heard on different types of spraying and dusting equipment for application of both insecticides and fungicides.

The subject was to continue in the afternoon session, with Prof. W. W. Gunkel as chairman. Papers scheduled for this session included one by Dr. H. H. Schwardt, "Experience with Automatic Cattle Sprayers"; "Some Factors Affecting the Effectiveness of Concentrate Sprays," M. Semel and J. L. Brann, Jr., Cornell; "Shade Tree Mist Blower Formulations," by Dan F. Clower and Dr. J. G. Matthysse, Cornell; and "Results of Fungicide Tests on Florist Crops," by Dr. A. W. Dimock, Cornell.

No evening session was scheduled for Tuesday night.

Dr. A. F. Ross was chairman of the Wednesday morning program which was to include a number of papers on control of insects and diseases of vegetables. Dr. Charles Chupp, Cornell, was to present the recommendations for 1954 control of vegetable diseases and Dr. S. E. A. McCallan, Boyce Thompson Institute for Plant Research, Yonkers, N. Y., was to report "Studies on the Nature of Fungicidal Action."

Under the chairmanship of Dr. Charles E. Palm, head of the Department of Entomology, Cornell, and president of the Entomological Society of America, the Wednesday afternoon session was to feature a number of papers discussing problems of insect control. Dr. H. L. Haller, assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D.C., was to present a paper on "Systemic Insecticides"; Drs. J. E. Dewey and A. C. Davis, "Progress Report on Insecticide Residue Studies"; and Dr. R. W. Leiby, Cornell, was to present the "Vegetable and Potato Insect Control Recommendations for 1954" to complete the afternoon's agenda. The annual banquet was scheduled for Wednesday night at the Hotel Ithaca.

Thursday morning's session was to continue the meeting, with Dr. Chapman as chairman. This program was to include a paper by Dr. J. M. Hamilton, Cornell, "Report on Development of Fungicides for Fruit Disease Control"; "Fruit Disease Control in the Hudson Valley," by Dr. D. H. Palmiter, Poughkeepsie, N. Y.; and the presentation of "Fruit Disease Control Recommendations for 1954" by Dr. W. D. Mills, Ithaca.

The meeting terminates Thursday afternoon following a session at which Dr. Hamilton is chairman. Following the presentation of a number of papers on control of fruit insects, Dr. A. A. LaPlante, Jr., Ithaca, presents a paper, "Fruit Insect Control Recommendations for 1954" after which adjournment is indicated.

•

Geigy Merges With Affiliate

Geigy Co., Inc., New York, was merged into its affiliate, Geigy Chemical Corp. at the end of October the firm has announced. Following the merger, the company's fourteen agricultural chemical plants and branches will operate under the name of Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation.

Geigy Chemical Corporation, a holding company, has interests in Geigy Chemical Company, Inc., whose McIntosh, Alabama plant produces basic insecticidal products, and Alrose Chemical Company, a Rhode Island manufacturer of agricultural and industrial chemical specialties.

Geigy entered the agricultural chemical field following the discovery of DDT insecticides by Dr. Paul Mueller of J. R. Geigy, S. A., Basle, Switzerland, in 1939. Popular demand led to the addition of many insecticides, weed and brush control chemicals, seed treating materials, and similar products, with the result that Geigy now has one of the most complete lines of products available in the agricultural chemical industry.

Concurrently with the addition of new products, the company has been enlarging its agricultural research program, with the result that such products as the metal "Sequestrenes," promising new soil supplements, are now being marketed.

•

Texas Pest Clinic Held

The Texas Livestock Pest Control Clinic was to be held in Breckenridge, Texas, on November 9, featuring a number of papers by well-known entomologists on problems involved.

Among the speakers named on the advance program, was Dr. R. C. Bushland, superintendent of the Bureau of Entomology and Plant Quarantine's station at Kerrville, Texas, who was to discuss new insecticides in livestock insect control. He was expected to present information based on his participation in the development of screw worm controls.

The all-day meeting is sponsored jointly by the West Texas Ranchers Association and the Association of Texas Manufacturers and Distributors of Veterinary Supplies. The meeting was expected to attract livestock producers and others interested in livestock pest control, mesquite control or other livestock subjects.

•

Louisiana Meeting for January

Announcement of the fourth annual Louisiana Insect Control Conference has been made by Kirby L. Cockerham, extension entomologist, Louisiana State University, Baton Rouge, La. The dates are January 14 and 15 at the Hotel Bentley, Alexandria, La.

New Fertilizer Spreader

A new type of commercial fertilizer spreader has been announced by Century Engineering Corporation of Cedar Rapids, Iowa. This new device is operated by power take-off rather than driven by the wheels.

The makers describe it as having a reciprocating, rather than revolving action. The agitator has six rows of saw teeth, with teeth on both the top and bottom of the agitator. The agitator moves approximately eleven hundred times a minute over each of the flow openings.

A three-speed control has been incorporated for changing the stroke of the agitator. The shortest stroke is used to avoid damage to free-flowing seeds and pelletized fertilizer, and to permit applying very small amounts per acre. The intermediate stroke is used for non free-flowing seeds and the majority of dry type fertilizers. The longest stroke, which is a heavy duty slashing stroke, is used primarily for breaking up hard, chunky fertilizer, and application of large amounts of fertilizer per acre. Changeover requires only a few minutes, without the use of tools.

The manufacturers say that the spreader cannot be stalled by chunky fertilizer and that the flow is positive even on wet or frosty ground.

The Century Spreader will handle all types of commercial fertilizer in any condition and in any quantity up to approximately 3000 lbs. It will also handle any type of seeds from those as small as Red Top or clover to those as large as soy beans. The special shape of the individual valves permits sowing in quantities as little as two pounds of seed per acre.

The spreader is illustrated in the picture at the bottom of this page.

Further details are available from the manufacturers; Century Engineering Corp., Cedar Rapids, Iowa.

•

Pest Control HQ Move

The plant pest control offices of the Connecticut Agricultural Experiment Station have been transferred to the station's tobacco laboratory at Windsor, from its previous location in Danielson, Conn. The move was made to better centralize the activities of the pest control branch of the station.

At the time the office was established, its primary function was to deal with outbreaks of the gypsy moth, an insect pest of forests then limited to the eastern half of the state. At the present time, the gypsy moth has spread over almost all areas of Connecticut. Oscar B. Cooke, entomologist, is in charge of the office.

•

To Distribute Vermiculite

Whittaker, Clark & Daniels, Inc., New York, have announced their handling of vermiculite, produced by the Zonolite Company, Chicago. The material, mined by Zonolite in Montana and South Carolina, has application in the fertilizer trade.

The distributors describe the product as being light in weight and free-flowing. One of the predominating chemical properties of vermiculite is that of base (ion) exchange.

•

New MSA First Aid Kits

Mine Safety Appliance Co. recently issued a bulletin describing a series of new first aid kits, designated as "Type D". The labeling meets the latest requirements of the U.S. Pharmacopeia and the Food and Drug Administration. General contents for complete kits and refills are detailed. Write the company, at Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

•

Purdue Conference in January

Dr. J. J. Davis, Chief in Entomology, Purdue University, Lafayette, Ind., has announced that the 18th annual Pest Control Operators' Conference will be held at Purdue U. the week of January 25, 1954.

Details of the program will be announced later, Dr. Davis indicated.

•

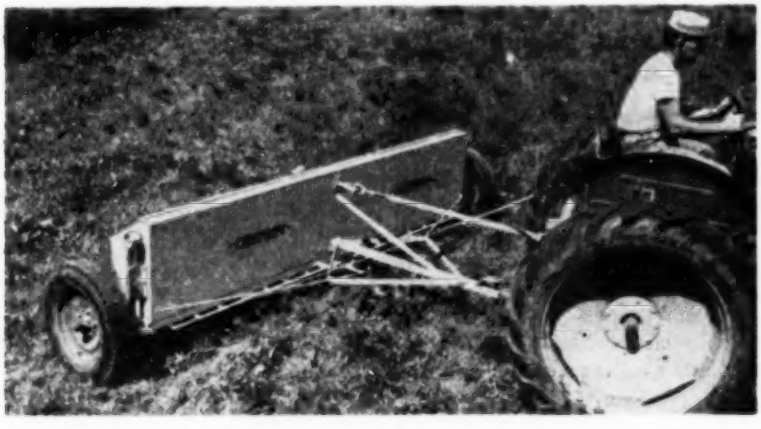
New Ammonia Plant Opens

The $2,000,000 ammonia plant of Commercial Solvents Corp., located in Sterlington, La., recently went into operation to more than double CSC's ammonia production. Ammonia produced in the new unit will be processed into approximately 75,000 tons of ammonium nitrate fertilizer and 30,000 tons of nitrogen solution, both for use in crop fertilization. Nitrogen products will be sold primarily in the Southeastern states from Texas to the Atlantic seaboard. Methanol will also be produced at the new plant.

•

Chem. Mfgs. Meet

Chemical manufacturers of 42 nations, U. S. government officials, college and private industry representatives met with officials of the American Chemical Paint Co. early in October to compare various phases of products and production. The role of chemical weed control was among the subjects discussed.



New Anhydrous Ammonia Plant

An anhydrous ammonia plant having a daily capacity of 180 tons will be built in the Salt Lake City, Utah area, by Mill Creek Chemical Co., a newly organized firm. The plant will be built by Tears Engineers and Henry C. Beck Co. of Dallas, Texas. Organization and financing of the company is being handled by Glore, Forgan & Co., of Chicago and New York.

The plant will serve fertilizer manufacturers principally in Idaho, Oregon, Washington, Montana, Utah, Colorado, Wyoming, Nevada and western Nebraska.

•

New Stauffer Plant in Pa.

Stauffer Chemical Co. recently announced the construction of a new million-dollar plant for the manufacture of Crystex (insoluble sulfur) at Monongahela, Pa. The new plant is scheduled for initial production in May, 1954.

•

Arkell & Smith Expands

Arkell and Smiths, paper bag manufacturers, held an open house recently to mark the completion of a $300,000 expansion program at their Wellsburg, West Virginia plant. S. S. Yates, president of the company, reported that this is the fourth expansion, modernization program at the Wellsburg plant since 1930.

•

Potash Mine Tour Planned

Five potash companies with mines near Carlsbad, New Mexico, have cordially invited members and guests attending the American Society of Agronomy annual meetings in Dallas, Texas, to tour their mines and refineries Saturday, November 21st, 1953.

Located within 25 miles of the city of Carlsbad, these mining operations employ the most advanced methods and equipment to raise the potash ore from its resting place 1,000 feet beneath the desert floor.

Along with an interesting first hand view of the American potash industry, delegates will have an opportunity to tour the Carlsbad Caverns.

United States Potash Company, Potash Company of America, International Minerals & Chemical Corporation, Duval Sulfur & Potash Company, and Southwest Potash Company are cooperating in the tour.

Transportation facilities from Dallas to Carlsbad may be arranged at the registration desk in Dallas, the week of November 15th, or by contacting the executive secretary of the American Society of Agronomy, 2702 Monroe St., Madison, Wisc.

•

Dr. F. Otto Haas Elected V-P

Rohm & Haas Company has announced the election of Dr. F. Otto Haas as executive vice-president of the company. Dr. Haas graduated from Amherst College in 1936 and received a Ph.D. degree in Organic Chemistry from Princeton University in 1939. Employed on graduation as a research chemist by Rohm & Haas Company, he resigned this position in January 1942 to enter the Navy. Upon his release with the rank of Lieutenant Senior Grade in 1945, Dr. Haas immediately returned to the company where he has handled assignments in the production and sales divisions.

He has been a director of the company since 1948. In 1951 he was named a vice-president and member of the executive committee of the board of directors.

•

Arthur C. Ewer Dies

Arthur C. Ewer, manager of the Brooklyn plant of Bemis Bros. Bag Co., died October 19th, following a long illness. He had been with Bemis Bros. Bag Co. for 53 years, and manager of the Brooklyn plant since 1935.

•

Grace Chemical Elects

Elwyn E. Winne has been elected a vice-president and a director of Grace Chemical Company, New York. At the same time, William R. Thurston, president of Thurston Chemical and Naco Fertilizer Company, and John T. Whitely, an assistant vice-president of W. R. Grace & Co., have been elected directors of Grace Chemical Company. Dr. Ralph N. Lulek was elected a director and vice-president of manufacturing and research.

Mr. Winne came with the Grace organization in 1948 as a chemical engineer; he was formerly an assistant vice-president of both W. R. Grace & Co. and Grace Chemical Company. Mr. Thurston has been president of Thurston Chemical Company, which he formed, since 1944. Mr. Whitely joined the statistical department of W. R. Grace & Co. in 1949. He became an assistant treasurer in 1950 and an assistant vice-president in 1951.

•

CFA Meets at Carmel, Calif.

The California Fertilizer Association was scheduled to hold its 30th annual convention on November 9th and 10th in Carmel, California. According to announcements of the meeting, the following program was arranged:

PROGRAM

Monday, November 9, 1953

8:00 A.M. Registration, Front Porch, Playhouse

9:00 A.M. Address of Welcome, Honorable Horace Lyon — mayor, City of Carmel

9:05 A.M. Opening Remarks— B.H.Jones, vice president California Fertilizer Association

9:20 A.M. Annual Report— Sidney H. Bierly executive secretary and manager, C.F.A.

9:30 A.M. Activities of Soil Improvement Committee in 1953 and for 1954 chairman, M. E. McCollam

9:50 A.M. Agriculture's New Challenge Jesse W. Tapp, vice president, Bank of America

10:30 A.M. Report of the Year— Allen B. Lemmon chief, State Bureau of Chemistry, Sacramento

10:45 A.M. Relation between Fertilizer and Bigger Profits for the Farmer— Dr. Russell Coleman, president, National Fertilizer Association, Washington, D. C.

11:15 A.M. Soil and Nutrition (via Complete Proteins)— Dr. William A. Albrecht chairman, Dept. of Soils, University of Missouri, Columbia, Missouri

2:00 P.M. Award to Outstanding Industry Figure for 1953— James M. Quinn, past president, C.F.A.

INDUSTRY *News*

L. G. Porter, USDA, Dies

Lewis G. Porter, prominent in fertilizer circles for many years as chief of the fertilizer staff in the Production and Marketing Administration's Mobilization Activities Branch, died in Washington, D. C. October 14. He was 62 years old.

A native of Greenville, Ky., he obtained his schooling in a number of southern colleges and universities, including Richmond College, Richmond, Va. and American University, Washington, D. C.

Upon being graduated from Richmond College, he was engaged in various phases of the fertilizer business and was one of the pioneers in promoting use of synthetic nitrates and concentrated fertilizer materials.

Mr. Porter joined the U. S. Department of Agriculture in 1933 and has served in many capacities since that time. Most of his work was related to the production and distribution of fertilizer materials. He had occupied his last position with U.S.D.A. since 1945.

His widow, Anna, and two children, both married, survive.

•

Mathieson Promotes Cottrell

Promotion of S. Cottrell to the position of vice president of the Mathieson Agricultural Chemicals Division, with headquarters in Little Rock, Ark., was announced recently by S. L. Nevins, division president.

Mr. Cottrell joined Mathieson in 1949 as operations manager of the Mathieson Hydrocarbon Chemicals Corp. He was previously associated with American Potash and Chemical Corp., and Monsanto Chemical Co.

•

Velsicol Names Spaulding

WILLIAM M. SPAULDING

Velsicol Corporation, Chicago announced recently the appointment of William M. Spaulding as traffic manager. Spaulding was formerly assistant general freight agent for the Chicago Rock Island & Pacific Railroad, and has served as traffic manager with Pettibone-Mulliken Co. and Continental Can Co., both of Chicago.

•

New Ky Fertilizer Plant

The Southern States Cooperative Fertilizer Service announced recently the opening of a new fertilizer plant in Louisville, Ky. The new plant is expected to turn out more than 35,000 tons of Open Formula a year, with a daily shipping capacity of 350 tons. The new plant is designed to produce bagged fertilizer as well as mixed goods in bulk.

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Emulsol Appoints Bell

The Emulsol Corp., Chicago, recently named Jack Bell to its technical sales staff to handle industrial surfactants in the Chicago area, and its general food, pharmaceutical, agricultural and industrial surfactants in Minnesota, Wisconsin and northern Michigan territories. Mr. Hall was formerly employed in the Emulsol research laboratories.

•

Pakistan Fertilizer Plant

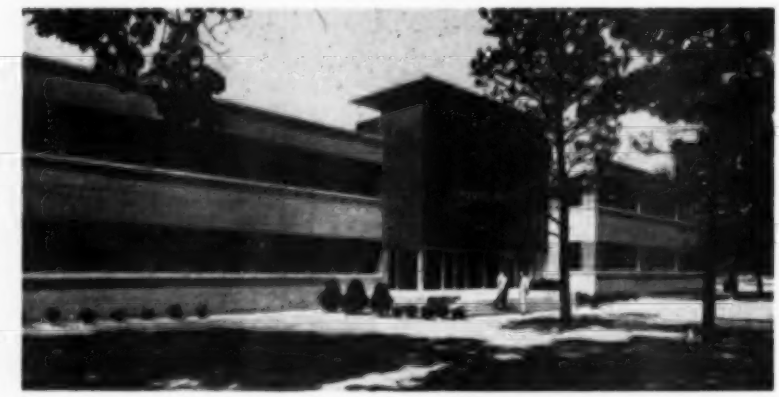
Construction of a new fertilizer plant was started at Daudkhel, Pakistan recently. It is expected to be completed in three to four years at a cost estimated at $13 million. Production of about 50,000 tons of ammonium sulfate a year will be used for the Indus River Valley food development program.

•

Stein, Hall President Resigns

Morris S. Rosenthal has resigned as president and director of Stein, Hall & Co., New York, the company has announced. Mr. Rosenthal will be succeeded by Lawrence Gussman. Mr. Gussman is also president of Stein-Davies Co., a manufacturing subsidiary of Stein, Hall and was a vice-president of the firm in charge of its manufacturing and technical divisions. The announcements were made by Edwin Stein, chairman of the board of directors.

Nitrogen Division Opens Research Plant



Above: Partial view of Nitrogen Division's new organic research laboratory at Hopewell, Va. Two buildings provide 40,000 square feet of working space.

NITROGEN Division recently dedicated a new organic research laboratory and development center at Hopewell, Va. The plant, consisting of two buildings, provides nearly 40,000 square feet of working space. It is located next to the Division's ammonia laboratory. Here the nitrogen research staff devotes itself to fundamental research on ammonia and related nitrogen products, to the development of new processes and products and to discovering new uses for nitrogen products in agriculture and industry.

In his dedicatory address, Hugo Riemer, president of Nitrogen Division, pointed out that "without the nitrogen industry, U.S. farmers would have to cultivate an additional 50 million acres of land to feed our present population."

Nitrogen division officials participating in the dedication ceremonies included Dr. M. F. Fogler, executive vice-president; Dr. C. S. Fazel, vice-president in charge of research, and Frank O. Agel, director of development of the Division's organic section.

Nitrogen Division, the largest producer of fixed nitrogen in the United States, is an operating unit of Allied Chemical & Dye Corporation. The Division is a complete operating unit engaged in production, distribution, sales, research, enginering and construction in connection with nitrogen and organic chemicals. Its products include anhydrous ammonia; sodium nitrate; ammonium nitrate-limestone; urea; ammonia, ammonium nitrate and urea solutions; high-analysis, complete fertilizer; methanol; formaldehyde; chlorine, and ethylene oxide and glycol.

In addition to Hopewell, Nitrogen Division plant cities include South Point, Ohio, Orange, Texas, and Omaha, Nebraska. The Hopewell plant went into run in 1928 as the largest nitrogen installation in the United States, a distinction it still holds. Its successful completion, hailed as "one of the greatest U.S. chemical achievements," made our country independent of foreign supplies of nitrogen for the first time. The South Point and Omaha plants are also devoted to nitrogen production.

•

Fertilizer Application Meeting

The National Joint Committee on Fertilizer Application will meet December 7th at the Edgewater Beach Hotel, Chicago, Ill. The meeting is sponsored jointly by the Power and Machinery Division, American Society of Agricultural Engineers, and the National Joint Committee on Fertilizer Application. The scheduled program is as follows:

Presiding: George B. Nutt (Clemson Agricultural College), Vice-chairman, National Joint Committee on Fertilizer Application.

9:30—History and Objectives of The National Joint Committee on Fertilizer Application—S. D. Gray, general chairman, National Joint Committee on Fertilizer Application.

9:45—New Horizons in Fertilizer Application—Firman E. Bear, professor of Agricultural chemistry, Rutgers University.

10:30—New Developments in Fertilizer Materials—Edwin C. Kapusta, Chemical Engineer, National Fertilizer Association.

11:00—New Developments in Fertilizer Machinery—C. A. Guelle, manager of seeding, potato and beet machinery sales, International Harvester Company.

11:30—Fertilizer Application in Practice—A. C. Thompson, owner, Thompson's Farms.

Presiding: Roy Bainer (University of California), vice-chairman, Power and Machinery Division, ASAE.

2:00—Placing Fertilizer for Efficient Production (Panel)—Kirk Fox (moderator), editor, *Successful Farming*. Corn—G. A. Cumings, U.S. Department of Agriculture. Cotton—Leonard Lett, National Cotton Council. Sod Crops—H. A. Woodle, Clemson Agricultural College. Small Grains—Floyd W. Smith, Kansas State College. Vegetable Crops—A. C. Thompson, Thompson's Farms.

3:30—Summary—Kirk Fox.

•

Plant Clinic Established

A "flower clinic" has been established at the University of California, Los Angeles, to help protect California's multi-million-dollar flower crop. Diseased plant tissue is examined under microscopes to determine the nature of infection. Disease organisms from infected plants are cultured in the laboratory and injected into "guinea pig plants" in the attempt to develop cures or preventive techniques to combat the disease. Dr. K. F. Balker, Dr. J. G. Bald, Dr. E. Muniecke, and P. A. Miller make up the staff.

•

C. W. Berl, Hercules, Dies

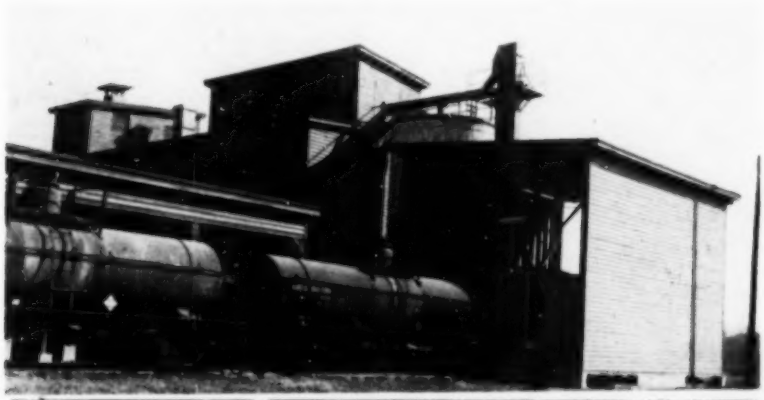
C. W. Berl, market survey manager of the sales research division of the Hercules Powder Co., Wilmington, Del., died recently of a cerebral hemorrhage in Lewes, Del. A graduate of Princeton University, Mr. Berl conducted an aerial crop dusting business before joining Hercules. In 1949, he went to France on an Economic Co-operation Administration assignment.

Virginia-Carolina Modernizes Tenn. Plant

MORE than 200 customers, dealers and guests attended the "open house" early in October of Virginia-Carolina Chemical Corporation's enlarged and remodeled fertilizer plants at Mt. Pleasant, Tenn. New hoppers, elevators and manipulator have been installed, as well as suspended dial scales in connection with the manipulator, which makes the operation of mixing more efficient, as well as easier for the operator.

Another improvement in the plant, to make storage faster and easier, has been effected by the use of a pile trimmer which distributes the mixed fertilizer to any part of a storage bin. All materials used in manufacturing are handled by Hough "Payloaders". These machines feed a system of elevators and overhead conveyors that transports the material to storage, as well as to the formulation hoppers. The "Payloaders" are also used to haul fertilizer from the storage bins to the bagging and sewing machines.

In modernizing the plant, a new superphosphate storage building with all new manipulating equipment was built. An acid storage tank with a capacity of 175 tons of sulphuric acid was also added during the construction. The Mt. Pleasant plant, with 79,300 square feet under cover, is now in full operation to more than double the output. Dealers in Kentucky, Ohio and several southern states are supplied by V-C's Tennessee plant.



At left, top photo, new portion of plant, showing silo for phosphate rock dust storage, etc. Middle: electrical control panel for new equipment. Bottom: "Wet mixer" for producing superphosphate.

•

Hormone Weed Killer

Plant Protection, Ltd., the British concern, will put on the market a concentrated form of its present Methoxone hormone weed killer. The new product will be known as Agroxone IV.

•

Trona Products Under Study

A new program based on the upgrading of Trona products into fine chemicals for use by agriculture and industry was announced recently by Peter Colefax, president of American Potash & Chemical Corp., in a recent address before the New York Society of Security Analysts, Inc.

Describing the various markets for the company's basic chemicals, Colefax outlined plans of the development program in connection with certain products, such as boron compounds, lithium and bromide. "Lithium and bromine," Colefax said, "are receiving considerable emphasis because they typify our program of upgrading our basic chemicals."

Pyrenone*

Pyrenone is a registered trademark used exclusively to designate ratios and concentrations of piperonyl butoxide and pyrethrins.[1] Pyrenones have gained universal recognition for high standards of efficiency in the formulation of widely diversified finished insecticides.

It frequently occurs that some users who have been delighted with one particular Pyrenone concentrate are unaware of the availability of the wide selection of other types of Pyrenone products which would have special value to them in other pest control problems.

All of the Pyrenone concentrates are prepared to meet certain characteristic requirements of formulators of finished insecticides. While a large number of insecticides are based on Pyrenone alone, there are almost as many others which combine Pyrenone with chlorinated hydrocarbons, phosphates, thiocyanates and other active ingredients.

Where fast knockdown is desired at an economical cost, a specific Pyrenone formulation is preferred.

Where low toxicity is essential for special reasons, there are other Pyrenone combinations.

Where residual characteristics are involved, still other Pyrenones are available.

And frequently Pyrenone concentrates are used as a part of a complex formulation designed for general purposes.

If you do not formulate finished products yourself, but are faced with problems from time to time needing improved products for pest control work, ask your supplier to contact the U.S.I. office in his area. Many formulators are taking full advantage of U.S.I.'s consulting service which is available without obligation.

[1] Many manufacturers have requested permission to use the name Pyrenone on their labels and with certain restrictions – one of which stipulates their formula contains no toxic ingredients other than piperonyl butoxide and pyrethrins – permission has been granted. Further details furnished upon request.

For progress in insecticides, keep your eye on

Pyrenone*

*Reg. U. S. Pat. Off.

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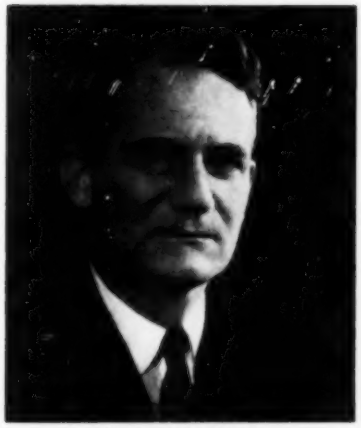

WM. F. JACOBI

Union Bag and Paper Corporation has announced the appointment of William F. Jacobi as manager of the newly-created Multiwall Machinery Department. This department will be responsible for the sales, service and administration of all multiwall packaging machinery sold through the company.

A member of the Union organization since 1946, Mr. Jacobi served most recently in the company's Market Research Department.

•

New S. C. Fertilizer Co.

Singletary Fertilizer Co., Lake City, S. C. has been organized recently with capital stock of $100,000 to manufacture and deal in fertilizer, wholesale and retail.

•

Saline Soil Research

The only research laboratory in the world specializing in the study of growing crops in salt bearing soils is located at Mt. Rubidoux, California. Its cooperative work with experiment stations of 17 western states and Hawaii has decisively influenced the rapidity and growth of irrigation agriculture in states west of the Mississippi River.

The salinity lab was set up by the U. S. Dept. of Agriculture in 1938. Today, it has a staff of about 35, operating on an annual budget of approximately $170,000. Its objective is finding the answers to problems encountered in growing crops on saline and alkali soils, reclaiming these soils, learning more about the relationship between salinity and irrigation, drainage and soil management practices.

•

Lime Association Meets

The National Lime Association held its operating meeting October 12-14 in Birmingham Ala. An open forum discussion with representatives from important lime consuming industries highlighted the meeting. Included in the panel discussion were: H. O. Tittel, Monsanto Chemical Co.; H. A. Caldwell, Tenn. Coal & Iron Div., U. S. Steel Corp.; H. M. Owen, Gulf States Paper Corp.; and Hayden Brooks, Blue Diamond Co. Moderator of the session was C. C. Loomis, New England Lime Co.

Another program feature was a tour of five different lime plants in the Birmingham area.

•

Richardson Scale VP Retires

Vice-President John P. Clifford of Richardson Scale Co., Clifton, N. J., an authority in the field of automatic weighing, bagging and proportioning, retired recently after almost 50 years of company service. He will, however, continue to serve the company as a consultant.

A pioneer in the development of the modern automatic scale, Clifford was associated with Henry Richardson, founder of the company, in 1902 when the two were employed by Avery Scale Co. in England. He joined Richardson Scale Co. in 1904 shortly after Richardson came to this country to establish the present company. One of his foremost engineering achievements was adapting automatic scales for proportioning operations.

•

Spencer '53 Sales Up

The annual report for 1953 distributed recently by the Spencer Chemical Co., Kansas City, Mo., showed total assets to equal $64,344,571 as compared with $52,431,498 for 1952. Net sales for 1953 were $30,837,455 compared with $28,771,733 for 1952; earnings per common share were $4.01 in 1953 as compared with $3.61 in 1952.

Pouchot Joins Chase Bag

J. F. POUCHOT

Chase Bag Co., Chicago, recently appointed J. F. Pouchot as sales representative for its Chicago sales offices. Prior to joining Chase, Mr. Pouchot was employed by the Textile Bag Manufacturers Association.

•

N. E. Weed Control Meeting

The annual meeting of the Northeastern Weed Control Conference is to be held at the Hotel New Yorker, New York City, January 5-7, 1954. Authors are requested to have submitted titles of papers to be presented at the meeting by October 31, also to limit the length of any one paper to ten pages.

Subject matter chairmen are reported as: Horticultural Crops and Nurseries, Dr. E. M. Rahn, Univ. of Del., Newark, Del.; Agronomic Crops and Turf Agronomic Crops, Dr. S. N. Fertig, Cornell Univ., Ithaca, N. Y.; Turf, Dr. J. A. DeFrance, R. I. Exp. Sta., Kingston, R. I.; Forestry and Industrial Weed Problems, Dr. C. H. Foster, Warrensburg, N. Y.; Public Health, Mr. A. Wallach, Dept. of Public Health, Yonkers, N. Y.; General Subjects, Dr. J. Van Geluwe, G. L. F. Soil Bldg Serv., Ithaca, N. Y.

•

New Fertilizer Plant

International Minerals & Chemical Corp., recently engaged to construct a $260,000 fertilizer plant at Clarksville, Tenn. Work is expected to begin immediately.

for SAFETY'S SAKE use

EMULSIFIABLE SULFOXIDE-PYREXCEL 1-10

(PYRETHRINS *PLUS* SULFOXIDE)

Emulsifiable Sulfoxide-Pyrexcel 1-10 in proper dilution is safe for direct application to dairy cattle and other livestock.

In the Dairy Barn

In the Milk Handling and

Milk Processing Rooms

In fact, wherever a *safe insecticide* is required.

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S. B. PENICK & COMPANY

New Multiwall Bag Valve

Arkell and Smith, Canajoharie, N. Y., multiwall bag manufacturer, was recently issued a patent covering a special valve formation on pasted multiwall bags used for hydrated lime and other finely pulverized materials. The valve designed to reduce sifting, has been trade marked under the name of "Lock-Rite." The patent names Jom Jones, who joined the Arkell and Smiths staff in 1947, as the inventor.

•

Vegetable Colloid Information

"Jaguar" is Stein, Hall's trade name for guar gum, a new, natural vegetable colloid, which is being offered to industry in commercial quantities for a wide range of uses.

The company has prepared a fourteen-page booklet, illustrated with informative charts, describing the new hydrophilic colloid and presenting technical data on its physical and chemical properties.

Some of the more important points explained in this latest addition to colloidal literature are that "Jaguar" produces high viscosity at low concentrations, is cold water swelling and develops its properties over a wide pH range. Data is presented demonstrating its thickening, film forming and stabilizing characteristics.

Copies of the booklet as well as free samples of "Jaguar" may be had by writing to: "Jaguar," Stein, Hall and Company, Inc., 285 Madison Avenue, New York 17, New York.

•

C. Ball Free Sales Agent

C. J. Ball recently resigned his position as manager of the Norfolk office of the Phillips Chemical Co., and has opened his own office at 207 Royster Bldg, Norfolk, Va., operating in the capacity as sales agent for fertilizer materials and allied products. Among others, Mr. Ball will represent Bradley and Baker in the promotion and sales of their nitrogen products in the North Carolina and Virginia territory.

For the past 25 years, Mr. Ball has been identified with the fertilizer materials business in the Southeast. Before joining Phillips in 1949, he was southern sales manager for the Barrett Division, Allied Chemical and Dye Corp.

•

Chase Bag Promotes Trigg

J. B. TRIGG

W. N. Brock, general sales manger of the Chase Bag Co., Chicago, Ill., announced recently the promotion of J. B. Trigg to sales manager of the Buffalo branch offices. Mr. Trigg has been a sales representative for the Chase-Dallas branch since 1947, and formerly represented the eastern Washington territory.

•

Chile Nitrate Strike Ends

Nitrate mine workers of the Anglo-Lautaro Nitrate Co., Chile, ended a walkout recently, which had started early in September. The partly American-owned company normally ships about 700,000 tons of nitrate of soda annually to the United States.

•

Southern Weed Conf. for Jan.

Chemical weed control is scheduled to receive top billing during the Southern Weed Conference in Memphis, January 11-13, according to a recent announcement by Dr. W. B. Ennis of the Mississippi Agricultural Experiment Station, conference chairman.

Those attending the conference will represent land-grant colleges, the United States Department of Agriculture, and private industry. They will review herbicide work carried out in 1953 and plan additional studies for 1954. One feature of the conference, according to Dr. Ennis, will be an exhibit of herbicide materials and application equipment. Also, for the first time in the history of these annual meetings, a special session has been arranged for extension service personnel who encounter weed control problems in their work.

•

Mathieson Names Two

John W. Yale, Jr., and George Barnes, who received the PhD degree in plant pathology from Oregon State College in June, have joined the agricultural development program of Mathieson Chemical Corporation.

Dr. Yale will make his headquarters at Whittier, California and will represent Mathieson in its agricultural chemical development work in the eleven western states. Dr. Barnes is engaged on the Mathieson project of screening new chemicals for agricultural applications at Ohio State Research Foundation, Columbus, Ohio.

•

New Fertilizer Rules in N. C.

North Carolina's State Board of Agriculture recently adopted rules and regulations relating to the storage, sale and distribution of anhydrous ammonia and other liquid fertilizers. The new regulations require registration of liquid fertilizer contractors, their agents or employees engaged in applying liquid fertilizers for hire, and spell out certain safety standards for the storage and distribution of the products.

Classifying storage tanks and apparatus for a handling anhydrous ammonia as "high pressure equipment", the board specified that such tanks should be constructed for a working pressure of 250 pounds per square inch and otherwise conform to generally accepted engineering standards for this type of equipment. The board further specified that equipment used for storage and handling anhydrous ammonia should not be used for other liquid fertilizers nor any corrosive material.

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advantages

The St. Gobain process manufactures complete Nitrophosphate granulated fertilizers in one continuous automatic operation. Its extreme flexibility permits the production of various nitrogen-phosphorus-potash formulae without altering the equipment.

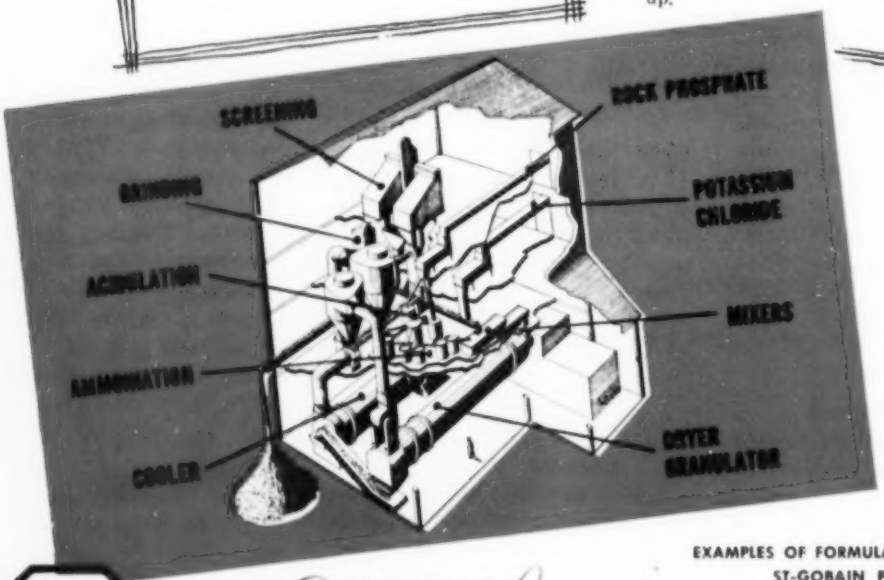
benefits

You benefit from the improvements made during the ten years of successful industrial operation. The St. Gobain system reduces the sulphuric acid consumption by replacing it with nitric acid. No phosphate rock grinding is necessary.

Capital

Investment and operating costs are low due to simple equipment, continuous operation, and to a very high yield.

St. Gobain plants are built for 30,000 tons of fertilizers yearly capacity and up.



EXAMPLES OF FORMULAE PRODUCED BY ST-GOBAIN PROCESS

N %	P_2O_5 %	K_2O %	
10	10	17	(sulfo-nitric acidulation)
11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

For further information write to

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AGENTS FOR ST-GOBAIN PROCESS

100 Attend Rutgers Soil Course

MORE than 100 dealers and salesmen of fertilizer, lime and farm machinery attended the refresher course in soil management held Oct. 7 and 8 in the Stacy-Trent Hotel, Trenton, N. J., under sponsorship of the Extension Service and Soils Department of Rutgers University.

Dr. Arthur M. Smith, chief agriculturist at the Mathieson Chemical Corporation, Baltimore, speaking on the commercial man's place in promoting good soil management, pointed out that knowing and promulgating basic fundamental facts of soil science helped to put all people on a speaking acquaintance with soils, thereby helping them to better rationalize and develop fitted recommendations for their own peculiar land conditions. He also pointed out that it is now possible for the fertilizer industry to produce nitrogen at a lower cost than the farmer can do with the aid of legumes.

Dr. Fred G. Merkle, professor of soil technology, Pennsylvania State College, showed by slides and data that the proper use of lime grew better root systems which in turn developed a much stronger soil structure and allowed a more efficient entrance of water for better plant growth.

L. W. Garver, market research director of the Massey-Harris Company, Racine, Wis., discussed a number of machines that could be used in good soil management.

Dr. William L. Garman, professor of soils, Cornell University, spoke on fitting the crop to the soil. He pointed out that many soils have great producing potentials if the proper crop is used and stated that when crop and soil do not match three things can be done:

1) The soil can be altered (such as by draining) to fit the crop; 2) the crop fitted to the soil, wet land crops on wet land. This method is least expensive but the system of farming may have to be changed; 3) disregard either and take the risk which accompanies such a system.

Dr. William J. Hanna of Rutgers showed that a lime requirement measurement and pH were two entirely different things. He stated that if a soil contained all mineral acids it could have a pH of 1.0, whereas the same amount of organic acids would give the soil a pH of 3.0, yet it would require the same amount of lime to move the soil in either case to a pH of 7.0. This, he explained, was because pH measures only active acidity while lime neutralizes total acidity.

Dr. Firman E. Bear, chairman of the Rutgers Soils Department, discussed soil chemistry and plant growth. He concluded that with present know-how and materials it is possible for the world to feed many times its present population.

H. R. Slayback, extension specialist in soil conservation, Dr. E. R. Purvis, professor of soils, and Richard W. Lippincott, agricultural agent, Mercer County, were chairmen for the various meetings.

•

Oman Heads USDA Div.

Dr. Paul W. Oman, U. S. Dept. of Agriculture authority on leafhoppers, was recently named as leader of the Division of Insect Detection and Identification, Bureau of Entomology and Plant Quarantine. This division identifies, classifies and carries on taxonomic studies of insects for research entomologists, and directs a cooperative national insect pest survey and reporting service.

Dr. Oman has been with the BEPQ since 1928. He was assistant leader of the Division of Insect Detection and Identification since 1946.

•

Spain Opens 2 Potash Mines

Territory near the capital of Pamplona, Spain, estimated to contain 40 million tons of potash ore, is being prepared for development by Empresa Nacional Adaro, an affiliate of the state-owned Instituto Nacional de Industria. Mining operations are to be carried out at Astrain and Esparza de Galar. The ore is to be processed into various kinds of potassium fertilizer at a plant still to be built. Each of the two mines is expected to have an annual capacity yield of 680,000 tons of potash ore. The ore is reported to have an average K_2O content of 25 per cent.

•

Chemical Salesmen Meet

The second chemical sales clinic of the Salesmen's Association of the American Chemical Industry, Inc., was held October 19-21 at the Hotel Commodore, New York. H. K. LaRowe, director of purchases for American Cyanamid Co., New York presented the paper "A Purchasing Agent Looks at Salesmen." J. F. Crowther of Stauffer Chemical Co., New York, discussed the question of "Technical Training . . . Help or Hindrance in Chemical Selling?", while H. D. Hughes, general sales manager, industrial chemicals, Carbide and Carbon Chemicals Co., New York outlined the pattern of "In Company Training." More than 500 chemical salesmen and executives attended the meeting.

SAFETY MEETING

(*Continued from Page 55*)

was using an electric drill and apparently had not connected the ground wire properly. It was pointed out that the drill itself was completely dismantled and inspected and nothing whatever could be found out of order in its construction.

Comments from the floor were spontaneous and brought out a number of points. One questioner inquired whether a three-prong plug could have prevented such an accident. It was pointed out that it probably could have, but such equipment is expensive to install in an old plant. Even when available, workmen sometimes fail to use it as a precautionary measure. "You can't depend on the worker to do things like this for himself," was the comment of one speaker from the floor.

Another commentator reminded the group that if a ground wire is inadequate, it is possible to injure a number of men who are working on machines down the line. The electrical shock can carry for a considerable distance in this manner, he pointed out.

Another warning was sounded

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For Multi-Wall bags, "make it a habit to depend on Hammond."

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by one of the audience who reminded the fertilizer men not to scoff at a 110 volt wire. "These cause many more fatalities than you think", he said.

Mr. Cherry reported on an accident which happened in connection with a car puller. The workman had received full instructions on how to operate the machine, but it was a rainy day and he had sought protection from the weather by standing on the cable side of the machine. Although this was a forbidden spot, the workman apparently placed a higher value on staying out of the rain than playing it safe. The cable caught on his clothing, pulling him into the drum. He was able to reach the "off" button, but because rain had seeped inside the box, dampness continued the connection and the puller continued to roll. A fellow employee, rushing to the scene attempting to rescue the first man, himself became entangled and lost an arm in the puller. Meanwhile, other employees were dashing about the plant to seek a means of shutting off the electricity, eventually having to pull the main switch thus putting the entire plant in darkness.

The relating of this story brought about numerous accounts of more or less similar accidents and it was revealed that the plant in which the original accident occurred had since instituted a safety program which is now moving along very satisfactorily. The speaker commented that this workman had not died in vain, but it was pointed out how much better it would have been to have had a safety program to prevent the occurrence. The consensus from the floor was that car pullers in any situation are hazardous, since it is practically impossible to place an adequate guard around the cable and drum.

Mr. Bennett reported a relatively insignificant accident which occurred from having a spinning knob on the steering wheel of a shovel truck in the plant. He recalled that the driver was injured when the front wheel of the truck struck an obstruction in the path, causing the steering wheel to spin momentarily, catching the driver's thumb and spraining his wrist badly.

Mr. Bennett related that following this incident, all knobs on steering wheels were removed in their plant and there has been no recurrence of this type of accident. It was pointed out from the floor, however, that such an accident can occur from the wheel itself and at least one person, commenting from the floor, indicated that steering wheels had been removed on their machines and that horizontal bars were installed to replace the circular steering apparatus.

An accident involving the unloading of a scow was related by Mr. Dietz who told how one of his workman lost a leg while occupied in this work. The workman was standing on the wharf when a one inch rope, 60 feet long, which was holding the scow, formed a loop and caught his leg when a sudden breeze pushed the scow out to tighten the rope. He said that the workman could be accused of being careless in allowing his foot to get inside of the loop, but on the other hand, such a thing would not be difficult to do. To prevent recurrence of such an accident the company now keeps an extra man on the job to prevent the rope from looping and also to be able to help in any other emergency which may come up.

Mr. Fraser, in his description of a fatal accident, pointed out the hazards involved when fertilizer scooping machinery is used for purposes other than that for which it is intended. He told about an accident in which a loading machine was being used to transport a large pipe ten inches in diameter, from one part of the plant to another. The operator, when lowering the bucket and the pipe, stood up to see better and inadvertently struck his knee against the lever which threw the machine into reverse causing him to fall forward and into the pipe which caused fatal injuries.

The fact that the machine was out of control for only an instant and yet caused a fatality, brought comments from the floor to the effect that all machines must be under complete control at all times.

CO_2 Demonstration

NEARLY 100 fertilizer men were present at the demonstration of use of carbon dioxide in reducing piles of super phosphate and also mixed fertilizer as a substitute for dynamite. The crowd witnessed a number of explosions which brought down the face of stored material without shock to the building nor danger to any surrounding structures.

Curtis A. Cox, Virginia-Carolina Chemical Corporation acted as announcer at the demonstration, explaining each procedure as it was done. Mr. Cox has had wide experience in use of carbon dioxide in his own plants and declared that its use is a definite safety factor.

Upon returning to the city in two chartered buses, members of the executive committee were guests of the American Plant Food Council at lunch. Louis H. Wilson, secretary of the Council, acting as host in the absence of Paul T. Truitt, APFC president, welcomed the committee members and commended the work of the safety section in the conservation of life and limb. He pointed out that it is possible to see safety at work in plants that are clean, orderly and well managed. The good job being done by the safety section is a fine commentary on the entire fertilizer industry. Mr. Wilson pledged the continuing support of the APFC in future activities of the safety section.

The committee decided to hold its next meeting at the Safety Council headquarters in Chicago, Wednesday, January 13.

In the afternoon meeting of October 22, Thomas J. Clarke, speaking for Mr. Gornto, newly-elected chairman, absent because of illness, urged the fertilizer safety section to keep up its good work, maintain the team work which has characterized its activities to date, build up the present team, and develop a "farm system" composed of younger men who can be considered the leaders in fertilizer safety in years to come.

He pointed out the advisabil-

ity of getting individuals interested in safety as well as groups. He assigned each member of the fertilizer industry as a "talent scout" to go out and sell safety and to interest new people in it.

He urged that small plants be sold on the idea of safety; that the visual aids developed by the section be distributed widely; also that data sheets, engineering sheets, etc. be made widely available.

Local and state meetings should be held more frequently with large numbers of foremen and superintendents attending the meeting, he said.

Mr. Clarke concluded by indicating that the challenge of safety in fertilizer plants must be met with enthusiasm; that it is contagious; and that it is the only means for selling an idea such as safety.

Commenting on the foibles of the human race in connection with safety, Dr. Neal Bowman, National Association of Manufacturers, New York City, sparked his talk with stories and slogans to get his points across. At the outset he pointed out the human side of safety. From a doctor's viewpoint, he said, an accident victim may be termed as a "case," but actually it is *individuals* who are hurt, and this comprises much more than mere "statistics."

The rule is, he said, that there are less accidents in plants where both management and workers are safety-minded and more accidents in plants where they are not. He reminded that accidents are occurring at a fearful rate. In getting his point across about general safety habits, he quipped, "If we had more patient pedestrians, we would have fewer pedestrian patients". At another point, Dr. Bowman said that safety is like baseball. The score is calculated by the number of times one gets home safely.

He pointed out the carelessness of people as a prime cause for accident. "If we had as much horse sense as we have horse power, we would do a lot better," he said. "Only a minute is required to think of a safety slogan; perhaps an hour to make a poster; a week is required to set it up; a month to put it into action; a year to win a safety award but only one second to destroy the whole thing", he said.

Workers frequently fail to realize the consequences involved in taking chances. It requires a constant reminding to maintain safety consciousness in the minds of most workers.

He reiterated the idea of selling safety to everyone involved. "We must both advertise and sell the idea", he said. In order to do this, one must adapt his appeal to the field involved. The appeal must be in line with the interests of people involved; and words used must be both simple and meaningful. Best of all, he said, is the demonstration method which he said pays off better than anything else. The safety program is important for the survival of our way of life. We need more "amplifiers" to tell people about the program. The slogan should be, he said, "each one teach one".

A description of how a state department can be helpful in promoting a safety program was presented by Forrest H. Shuford, Commissioner of Labor, State of North Carolina, Raleigh. He said that a program of the type instituted in North Carolina serves three groups: First, capital; second, management; three, labor. He pointed out that none of these entities can operate without the other two. This is true also in the safety field where a good program is the result of teamwork.

He indicated that one of the goals of the North Carolina safety movement is to stimulate safety consciousness in the 70-odd fertilizer mixing plants located in the state. Each plant has somewhat to gain in the over all improvement of the safety record, since insurance rates are based on the total safety record of the state.

In describing the activities in his state, Mr. Shuford said that his department acts to stimulate, rather than sponsor safety. The movement began some years ago and operates in three phases: First, a special industry drive; second, a program of awards (not contests); three, education.

In order for the program to work effectively, the following procedure should be followed:

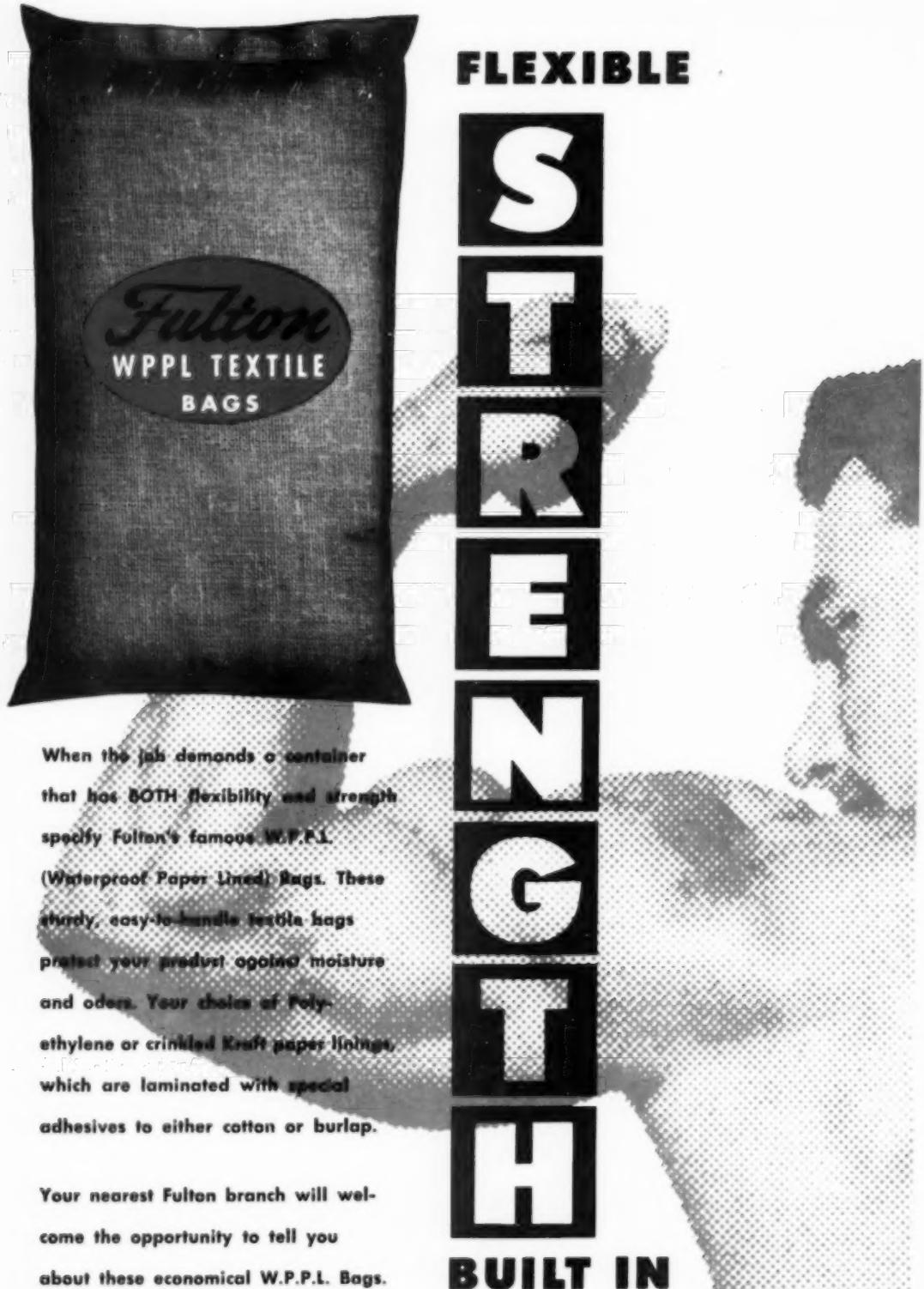
Sell the top management first; assign specific responsibilities; have a plan of operation and see that it is followed through; and pinpoint the accident problems involved in a given plant. That is, to find out what is causing accidents. First aid facilities must be maintained, adequate guards put around all machinery, a safety committee selected and plant inspections must be made by someone.

That such a movement has been successful in North Carolina was indicated by Mr. Shuford who reported that a decrease of 37% in the accident rate has been achieved there during the past six years. In the final analysis, however, safety records can be made only with the help of management which in the end is responsible for safety.

Final paper on the safety program was presented by Ralph J. Crosby, assistant vice-president in charge of accident prevention, Marsh and McLennan, Inc., New York. Mr. Crosby stated that the net result of a successful accident prevention program is always a profit. To amplify this statement, Mr. Crosby declared that a successful safety program is profitable because the results are not limited to the prevention of injuries but in addition, reflect very appreciably in the record of performance efficiency.

In order to present a successful program, he said a sincere and clearly stated policy on the part of management is necessary as the backbone of the procedure. This includes the instruction and training of supervisory personnel in the basic philosophy of accident prevention. He said further that a thorough investigation of all accidents must be made in order to carry out the program successfully.

Management should also arrange the coordination of accident data in a way that will highlight causes and of course avoid repetition of the same. Operating rules that integrate safety into the normal operating practices should be developed in order to make safety a part of the general every day procedure of the



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plant. The carrying out of investigations after an accident has happened is not enough, he said.

Mr. Crosby declined to charge safety with all the expenses involved. "A properly developed accident prevention program can be the vehicle for a successfully accomplished increase of productive effort. But it does not seem reasonable to charge the time and the administrative procedures required to do this, as the cost of a safety program.

"An accident is a positive warning that something has gone wrong. If we treat the occurrence in that light rather than allow our interests to be influenced by the severity of the injury that resulted, our investigation provides us with an excellent means of finding out what went wrong, why it went wrong and how it can be made right."

"A good accident investigation can be the vital part of a trouble shooting program. It can be the means of keeping top management alerted to the various short-comings in the organization's operations."

The determination of this kind of information is a part of a thorough investigation of an accident. But the benefits derived from the control of such conditions go far beyond the prevention of personal injuries. Therefore, the cost involved should not be charged to the safety program. Management should look upon the work of accident prevention as another valuable tool to help achieve efficient production.

During the afternoon program Lauren J. Shopen presented a resolution commending the efforts of six people for their activities in both establishing and developing the fertilizer section of the National Safety Council. Copies of the resolution in the form of plaques were presented to the following people. Dr. Russell Coleman, president, The National Fertilizer Association, Washington, D. C.; Paul T. Truitt, president, American Plant Food Council, Inc., Washington, D. C.; John E. Smith, retiring chairman, Spencer Chemical Company, Pittsburg, Kansas; Jack Fields, Phillips Chemical Company, Borger, Texas; A. B. Pettit, director of safety, Davison Chemical Corporation, Baltimore, Maryland; and L. A. Long, editor, Agricultural Chemicals Magazine, New York.

CMU IN SOIL

(*Continued from Page 53*)

and 10 weeks before planting. The sandy soil retained the toxicity of CMU longer than did the heavier soils with a higher clay content. The toxicity at all levels of application had practically disappeared in clay and sandy-clay soils within 10 weeks; whereas in the sandy soil the toxicity still persisted at the end of that time.

The data obtained in these experiments indicated that factors favoring soil microbial action, such as warm temperature, adequate moisture supply, the presence of mineral and organic matter, hasten the decomposition of CMU in the soil.

Persistence in the Field

THE following experiment was carried out to determine the persistence of CMU under field conditions:

On October 18, 1951, an area of Toa silty clay loam was plowed, disked, and divided into two randomized blocks each containing five plots. The individual plots were 10′ x 14′. Eighty per cent wettable CMU dispersed in water was applied with knapsack sprayers to the five plots in each block at 0, 1, 5, 10, 20 and 80 pounds per acre.

Immediately after treatment and at weekly intervals for 8 weeks, the 0, 1, 5, and 10 pound plots were planted with alternating rows of corn and velvet beans. One row of corn and one row of beans each containing 27 hills was planted weekly. After this period, the test crops were planted monthly in all plots except those treated with 1 pound CMU per acre.

The presence of CMU toxicity was determined by visible symptoms such as burning, chlorosis, and stunting, and by comparing, after 2 months growth, the fresh weight of plants from treated plots to that from check plots. When the plants from treated plots had no visible toxicity symptoms and their fresh weight compared favorably with that of check plants, toxicity of CMU was considered to have been dissipated.

Corn planted immediately after treatment in plots sprayed with 1 pound per acre showed no injury, but velvet beans in these plots were affected until the third planting which was made two weeks after treatment. Plots treated at the 5-pound rate remained toxic to both corn and velvet beans for four months. Plots treated at the 10-pound rate remained toxic to corn for six months and to velvet beans for eight months. Soil treated with 20 pounds per acre of CMU remained toxic for eight months to both test crops. After a year, the soil treated with 80 pounds per acre of CMU was no longer toxic to corn but it was toxic to velvet beans as evidenced by injury symptoms and stunting.

These data show that CMU

toxicity persisted in the soil for a long period of time even when applied at relatively low rates (for four months when applied at 5 pounds per acre) and therefore it should be used with caution. Contrary to the results obtained in the greenhouse, the corn was more resistant to CMU than the velvet beans. The reason for the difference in response of the two species of CMU toxicity under greenhouse and field conditions is not known. It should be pointed out that the tropical conditions under which the experiment was carried out (high rainfall and warm temperature) favor the disappearance of CMU in the soil. Table 1 shows the rainfall and temperature at Mayaguez during the experimental period. In more temperate climates the toxicity of CMU may persist even longer than was found here. Harris (3) found that when CMU was applied at 80 pounds per acre in Mississippi, the toxicity persisted for more than two years.

Movement of CMU in Soil

PREVIOUS experiments (7, 8) showed that salts of 2, 4-D did not move beyond the surface inch of Toa silty clay loam soil even when an inch of water was applied

TABLE 1

Weather conditions at the Federal Experiment Station, Mayaguez, P.R. from October 1951 through December 1952

Month	Total precipitation	Mean Temperature
1951	*Inches*	*°F*
Oct.	5.91	79.5
Nov.	8:53	78.2
Dec.	4:56	75.7
1952		
Jan.	2.48	76.1
Feb.	0.34	75.1
Mar.	1.68	76.3
April	4.97	78.5
May	9.79	80.0
June	7.88	80.5
July	8.21	79.9
Aug.	9:55	80.3
Sept.	10.95	79.8
Oct.	2.33	79.8
Nov.	3.59	77.3
Dec.	0.48	74.5

following the herbicide application. On the other hand, another herbicide, sodium trichloroacetate (TCA) moved downward in this soil type in direct proportion to the amount of water applied (4). The following experiment was carried out to determine the movement pattern of CMU in the soil type as affected by different rates of simulated rainfall.

The technique and procedure used in the present experiment were the same as those used in the 2,4-D and TCA experiments.

A level area of Toa silty clay loam was cleared of weeds and divided into 25 plots each 3′ x 3′. The soil moisture ranged from 15 per cent at the surface to 32.5 per cent at a depth of 12 inches with an average moisture content of about 30 per cent. The pH of the soil was 6.8 in the surface half inch and gradually increased to 7.3 at the 12-inch depth.

Five treatments replicated five times and arranged in Latin square design were initiated as follows: Five check plots were covered with paper and the remaining 20 plots were sprayed with an aqueous solution of 80 per cent wettable CMU at 5 pounds per acre applied with a knapsack sprayer.

Within three hours after the CMU was applied, groups of five plots were each watered with the equivalent of 0, ¼, ½, and 1 inch of rainfall. The water was applied with a sprinkler can into metal enclosures 18 x 18 x 6 inches driven several inches deep into the center of each plot. Practically all of the water applied eventually moved downward into the soil.

The following day, 6 x 6-inch layers of soil at ½-inch intervals for the first inch and then at 1-inch intervals to a depth of 12 inches were taken from each plot. These soil samples were obtained by digging a V-shaped hole 14 inches deep across the center of the plots and then removing the layers of soil with a broad knife and a spatula.

The soil from each sample was broken into fragments suitable for planting, was then mixed, and placed in cans in the greenhouse. Ten pigeon pea seeds were planted in each can and enough water applied for germination. Three weeks after planting, the fresh weight of tops of plants was obtained and this was used as a criterion of the presence of CMU in the soil. The peas planted in the surface half inch and the next half inch of all treated soil germinated almost 100 per cent. Within a few days after germination, however, they withered and died.

Seed planted in the corresponding levels of untreated soil germinated and made excellent growth. Peas planted in the second inch of treated soil germinated in most replications and grew almost as well as those in untreated soil, regardless of amount of rainfall applied. The fact that seedlings made somewhat less growth in the second inch of treated soil indicates that a small amount of CMU may have moved into this horizon of soil but the results were not sufficiently consistent to be statistically significant.

On the other hand, germination and growth of peas in the third- to twelfth-inch of treated soil was generally as good or better than that in the untreated soil, indicating that the movement of CMU was restricted to the surface inch of soil.

The photograph in figure 1 shows that CMU did not move appreciably beyond the first inch of soil, regardless of the amount of water applied. These data are in close agreement with those obtained in the similar experiment with sodium and diethanolamine salts of 2,4-D and are in direct contrast to the results obtained on the same soil type with sodium trichloroacetate.

In the 2,4-D experiment, the herbicide remained mostly on the surface of the soil and there was very little movement beyond the surface half inch, whereas the CMU moved down somewhat further, that is, into the second half inch of soil but not much further. The data show that different herbicides do not follow the same movement pattern on the same soil type and probably their behavior would vary on different soil types.

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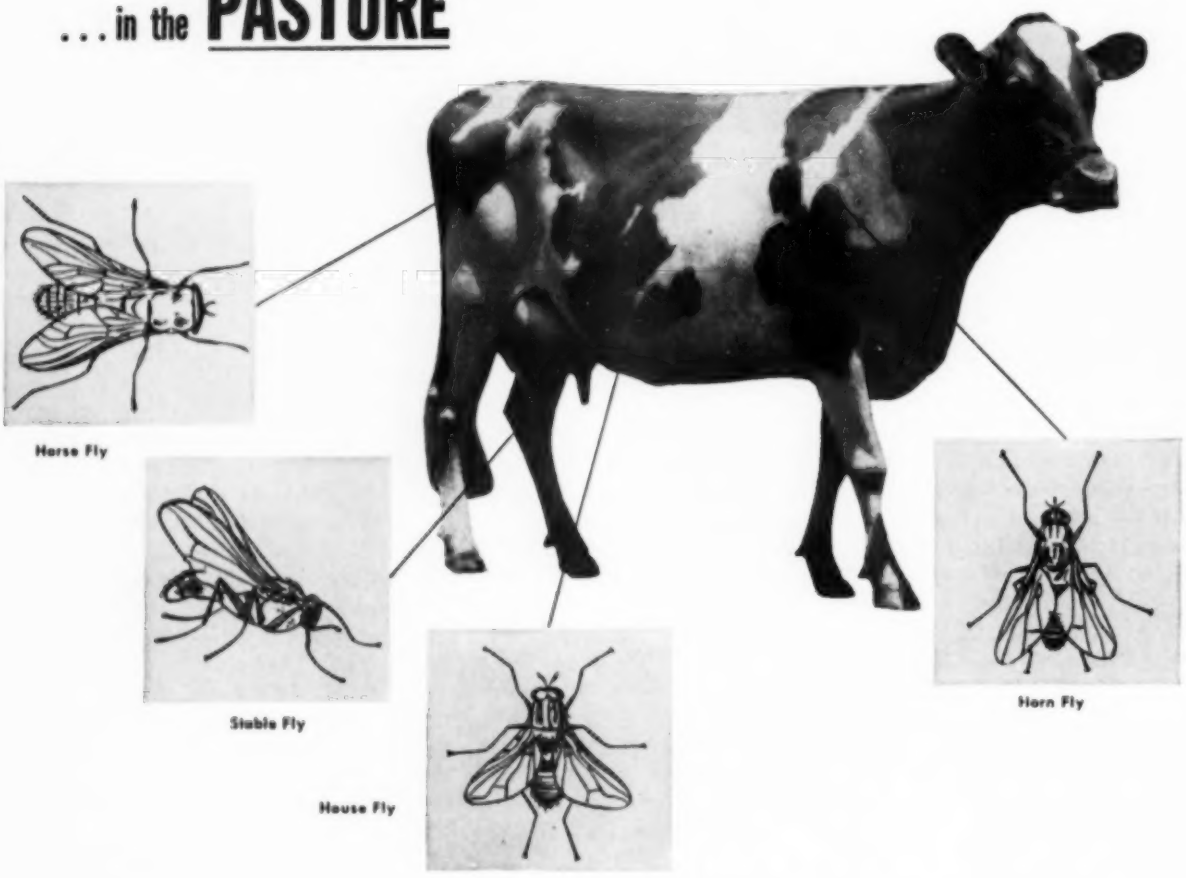

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cides move in the soil following rainfall is basic information that is needed particularly when the herbicides are used for preemergence.★★

Summary

A SERIES of experiments was conducted in the greenhouse and in the field to study the effect of environmental factors on the persistence and movement of CMU (3-para-chlorophenyl-1, 1-dimethylurea) in the soil.

Flats of soil treated with 0, 1, 5, and 10 pound per acre of CMU were stored for 0, 2, 4, and 10 weeks under various experimental conditions before being planted to corn and velvet beans.

The CMU toxicity persisted longer at 10° C. than it did at room temperature or at 45° C., but there was no consistent difference between the two warmer temperatures. As would be expected, the toxicity persisted longer at the higher rates of application at all temperatures.

CMU persisted longer in air-dry soil than in soil with a medium or saturated moisture level. Sandy soil retained the toxicity of CMU longer than did soils with a higher clay content. In general, factors favoring soil microbial action seemed also to favor the disappearance of CMU in the soil.

Under field conditions CMU applied at 1 pound per acre remained toxic to velvet beans for two weeks but it was not toxic to corn planted immediately after treatment. Soil treated with 5 pound CMU per acre remained toxic to both corn and velvet beans for four months and at the 10-pound rate the soil was toxic to corn for 6 months and to velvet beans for eight months. At the 20-pound rate CMU toxicity persisted in the soil for eight months to both test crops and at the 80-pound rate the soil remained toxic to velvet beans but not to corn for at least a year.

A field experiment conducted to study the movement of CMU in an undisturbed heavy clay soil, following applications of rainfall equivalent of 0, ¼ ½, and 1 inch, showed that the herbicide did not move appreciably beyond the first inch of soil regardless of the amount of water applied.

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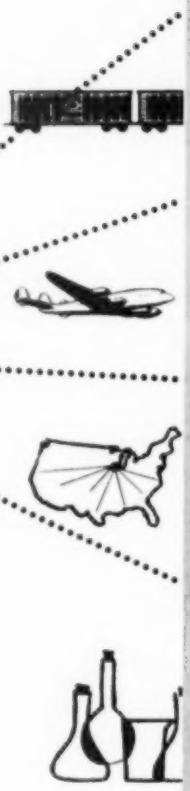

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LISTENING *Post*

Fungicides Tested for Control of Scab

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

R. S. COX, of the Delaware Agricultural Experiment Station, writes that scab caused by the fungus *Fusicladium pirinum* var. *pyracanthae* is a common disease on Leland firethorn *(Pyracantha coccinea lalandi)* in Delaware. Infection occurs on the fruit, leaves, and young twigs; fruit abscission, often as high as 100 percent, reduces its ornamental value and infected attached leaves, twigs, and fruit provide a reservoir of inoculum where the fungus persists from year to year in the vegetative stage. Inoculum thus tends to build up, resulting in increasingly severe defoliation.

Standard recommendations for control are Bordeaux mixture and lime sulfur. These materials are frequently objectionable because of unslightly residue, phytotoxicity, and inadequate control, alone or in various combinations.

During the years 1950-1952, inclusive, several of the newer fungicides, together with the standard fungicides, were field-tested to determine their effectiveness in scab control. Limited studies were also made on the effect of timing of applications on disease control. Results are summarized in this report.

A commercial planting of severely-infected firethorn shrubs near Lincoln, Delaware, was selected for this work. Test plots consisted of one replicate for each treatment in 1950 and 1951 and two replicates for each treatment in 1952. In all cases, each replicate consisted of several closely grouped plants. Because of uniform infection of all test plants, the limited number of replications employed is not considered a serious limitation in interpretation of results.

The following materials were supplied by the manufacturers: "Puratized Agricultural Spray" (phenyl mercury triethanol ammonium lactate), Gallowhur Chemical Corp.; "Fermate" (ferbam) (ferric dimethyl dithiocarbamate) and "Manzate" (manganese ethylene bis dithiocarbamate), E. I. duPont deNemours and Co., Inc.; "Phygon XL" (2, 3 dichloro- 1, 4-naphthoquinone), U. S. Rubber Co.; tribasic copper sulfate, Tennessee Copper Corp.; and "Orthocide 406" (N-trichloromethylthiotetrahydrophthalamide), California Spray Chemical Corp.

A small power sprayer delivering 350 pounds pressure was used, and the spray applied with a two-nozzle boom. Accurate data on spray gallonage were not obtained owing to non-uniformity of size of the shrubs. Good uniform coverage, however, was attempted.

Tests in 1950

THE 1950 program was primarily designed to screen several fungicides for their relative effectiveness in scab control. Ten applications were made, the first on April 20 and the rest at approximately ten-day intervals thereafter. Results are shown in Table 1.

Bordeaux mixture and "Puratized Agricultural Spray" were most effective. "Fermate" gave good control but was somewhat less effective, particularly as regards fruit infection. The other materials (liquid lime sulfur, "Phygon XL," and "Magnetic 70" sulfur) reduced leaf infection considerably, but did not materially reduce fruit infection as compared with that in the untreated plots.

Plant injury was caused by Bordeaux mixture and, to a lesser ex-

TABLE 1

Relative effectiveness of various fungicides in control of scab on Pyracantha leaves and fruit, Lincoln, Delaware, 1950.

Materials[a]	Concentration in 100 gals. water	Infection (percent)[b] Leaf	Fruit
Check	—	52	100
Bordeaux mixture	4 lbs.-4 lbs.	0	1
Puratized Agricultural Spray	1 pt.	0	2
Fermate	2 lbs.	2	14
Liquid lime sulfur	6 qts.	4	80
Phygon XL	½ lb.	4	99
Magnetic 70 sulfur	7 lbs.	25	100

[a] Fungicides applied: April 20; May 1, 10, 18, 31; June 16; July 11, 29; Aug. 4, 28.
[b] From a random sample of 500.

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tent, by "Puratized Agricultural Spray." Bordeaux caused moderate to severe foliage and fruit injury which resulted in considerable defoliation and shriveled unsightly fruit. "Puratized Agricultural Spray" caused no apparent foliage injury, but appeared to prevent normal fruit coloration. Although it was objectionable, this injury was not considered so serious as to prohibit use of the fungicide. The other materials were not noticeably phytotoxic. In fact, the fruit from shrubs treated with "Fermate" actually appeared to be slightly above average size and exceptionally deep in color.

1951 Test

THE purpose of the work in 1951 was twofold: (a) to compare the effectiveness of certain additional fungicides with the more promising one tested in 1950, and (b) to study the effect of timing and the number of applications of Bordeaux mixture and "Fermate" on control. Materials tested, frequency of applications and control data are shown in Table 2.

The experiment was so designed that direct comparisons of relative effectiveness could be made of all materials applied at ten-day intervals (including Bordeaux mixture and "Fermate").

In general, disease control was not so good in 1951 as in the previous year. This was particularly noticeable with Bordeaux mixture and even more with "Fermate." Control by "Puratized Agricultural Spray" was adequate although not so good as in 1950. Control with tribasic copper sulfate closely approximated that with Bordeaux mixture. "Manzate" and "Orthocide 406" were considerably less effective from the standpoint of disease control on fruit.

With respect to the effect of timing of applications on control, both Bordeaux mixture and "Fermate" were more effective when used at ten-day intervals.

Injury of the same type and of approximately the same magnitude as in 1950 was caused by Bordeaux mixture and "Puratized Agricultural Spray" again in 1951. Tribasic copper sulfate caused injury similar in type and severity to that caused by Bordeaux mixture. "Manzate" and "Orthocide 406" were apparently non-phytotoxic.

1952 Test

ALTHOUGH precise data were not obtained in 1950 and 1951 observations indicated that the early, closely-timed applications were the critical ones in regard to disease control. Accordingly, the 1952 test was designed primarily to gain more information on the effect of early applications on subsequent disease development.

One objectionable and sometimes unavoidable factor in such timing studies is re-inoculation of plots by means of spores carried in from the outside. To reduce this potential hazard, the more effective fungicides, i.e., "Puratized Agricultural Spray" and Bordeaux mixture, were used. The concentration of Bordeaux mixture was twice that used in previous years in the expectation of obtaining more lasting protection. Also, all shrubs in the test area were treated with one or the other of these materials. Untreated infected plants approximately 300 yards distant served as checks.

The test area was divided into four equal blocks, two of which, selected at random, were treated with "Puratized Agricultural Spray," the other two with Bordeaux mixture. Each block was further divided into three sub-plots. All of the sub-plots were treated with the proper material on April 29, and again on May 14

TABLE 2

Relative effectiveness of various fungicides, and effect of application timing in control of scab on Pyracantha leaves and fruit, Lincoln, Delaware, 1951.

Materials	Concentration in 100 gals. water	Frequency of application (days)[a]	Infection (percent)[b] Leaf	Fruit
Check	—	—	67	99
Puratized Agricultural Spray	1 pt.	10	7	14
Tribasic copper sulfate	3 lbs.	10	25	19
Manzate	1½ lbs.	10	28	34
Orthocide 406	1½ lbs.	10	31	48
Bordeaux mixture	4 lbs.-4 lbs.	10	24	20
	4 lbs.-4 lbs.	20	34	31
	4 lbs.-4 lbs.	30	27	56
Fermate (ferbam)	2 lbs.	10	35	55
	2 lbs.	20	46	81
	2 lbs.	30	62	81

[a] First application on May 1. The 10-day-interval series received a total of 12 applications; the 20-day-interval series, 6 applications; and the 30-day-interval series, 4 applications.
[b] From a random sample of 500.

TABLE 3

Effect of timing and number of fungicide applications on scab incidence on Pyracantha leaves and fruit, Lincoln, Delaware, 1952[a].

Materials	Concentration in 100 gals. water	Number of applications	Infection (percent)[b] Leaf	Fruit
Check	—	—	43	100
Puratized Agricultural Spray	1 pt.	2	2	12
	1 pt.	3	0	4.4
	1 pt.	4	0.4	0.7
Bordeaux mixture	8 lbs.-8 lbs.	2	6	18.6
	8 lbs.-8 lbs.	3	2	7.4
	8 lbs.-8 lbs.	4	1	4.8
L.S.D. .05			1.0	0.3

[a] Dates of fungicide applications: April 29, May 14, May 27, and July 11.
[b] From a random sample of 500 from each of two replications.

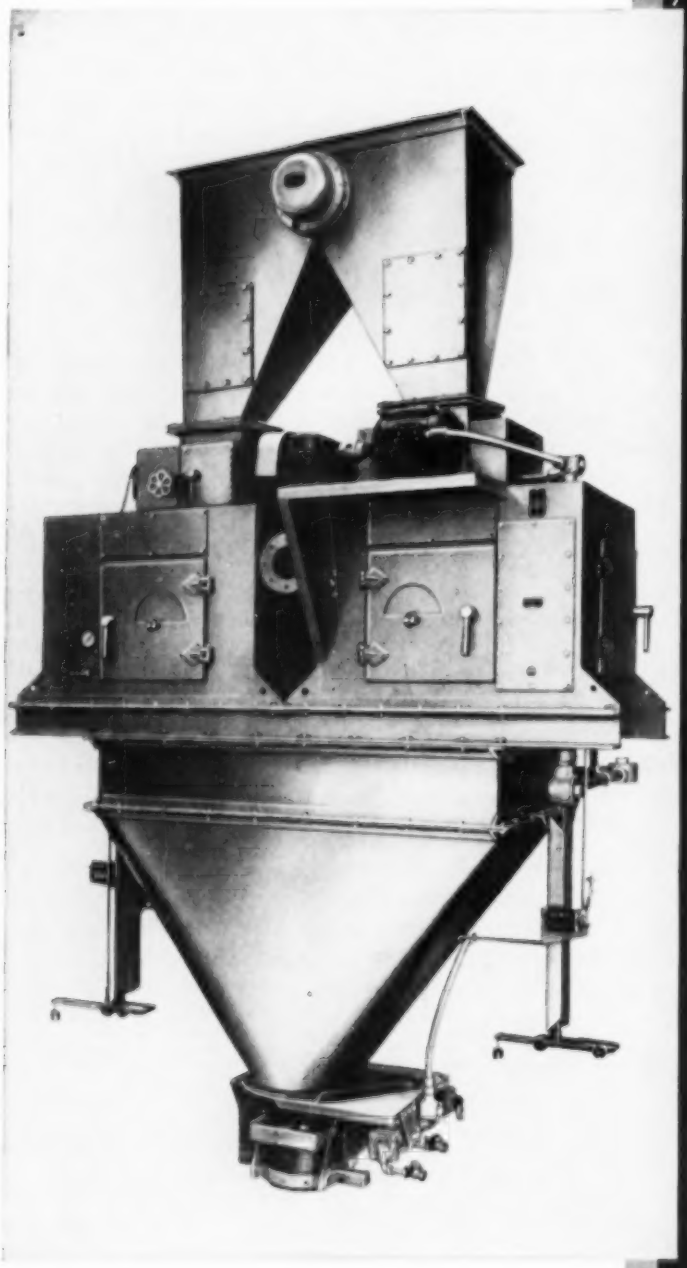

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TABLE 4

Apple fire blight and frog-eye leaf spot control, Starr variety, Bridgeville, Delaware, 1952.

Materials[a]	Concentration (ppm)	Percent infection[c] Fire blight	Frog-eye
Untreated		32	62
Thiolutin	120	16	35
	60	27	59
	30	17	56
Terramycin	120	24	55
	60	31	53
	30	33	74
Streptomycin sulfate	120	15	56
	60	16	55
	30	14	61
Copper rimocidin	120	30	50
	60	20	67
	30	32	60
Parzate	2400[b]	7	14
Dithane Z-78	2400[b]	15	17
Manzate	2400[b]	13	25
Raw thiolutin	120	25	54
	60	29	54
Raw terramycin	120	17	62
	60	29	57
L.S.D. @ 5% P.		16	15
L.S.D. @ 1% P.		22	20

[a] Before the test materials were applied, the entire block was sprayed with liquid lime sulfur (6 qts.-100) at the pink stage.
[b] Equals rate of 2 lbs.-100 gallons of water.
[c] Fire blight was first observed on May 13; frog-eye on April 29.

(blossom period). Two of the subplots in each block received a third application on May 27, and one a fourth application on July 11. Results are shown in Table 3. These data indicate that the first two applications were probably critical; although a third and even a fourth application produced additional beneficial results. "Puratized Agricultural Spray" was more effective than Bordeaux mixture.

Fruit again failed to color properly where shrubs received "Puratized Agricultural Spray" applications after fruit set (three or more applications). Injury by Bordeaux mixture was much less pronounced in 1952 than in preceding years.

Discussion

"PURATIZED Agricultural Spray" and Bordeaux mixture gave good control of *Pyracantha* scab over the three-year test period. "Puratized Agricultural Spray" was generally more effective than Bordeaux mixture. All other materials tested, except possibly tribasic copper sulfate, were less effective than these two in controlling this disease.

Timing appeared to be more important than the total number of applications. Three to four early applications of either "Puratized Agricultural Spray" or Bordeaux mixture in 1952 effected as good control as had been obtained from many more in previous years.

A point of particular interest was the absence of serious injury from Bordeaux mixture in 1952. This was undoubtedly due in part to the abbreviated schedule (two to four applications), but another circumstance not to be overlooked is the hot dry weather that prevailed during a considerable portion of the summer of 1952 which would tend to reduce the danger of injury from this fungicide.

Since "Puratized Agricultural Spray" is a soluble mercury compound with, consequently, poor tenacity, and since early applications showed lasting control over the entire season, it would appear that the action of this material is primarily

(*Turn to Page* 141)

European Corn Borer in Wyoming

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

IN the January, 1953, meeting of the Western Plant Board Uniform Quarantine Committee in San Francisco, it was requested that the Bureau of Entomology and Plant Quarantine cooperate with the member states to determine whether or not the European corn borer was present in the Western states. The survey began July 20 and was terminated September 14, 1953. Examinations were made in all of the Western states except Montana where the borer was reported from Dawson and Prairie Counties in 1952.

European corn borers were found for the first time in Wyoming with nine lots having been taken in Goshen, Crook and Platte Counties. The borer was found only in the irrigated sections of the counties mentioned, although inspections were also made in dryland corn. Two larvae were found in Adams County, Colorado. The borer had previously been taken in Crowley and Weld

TABLE I

State	Inspected			Man-Hours			No. Counties in which European Corn Borer Found
	Counties	Acres	Properties	Fed.	State	Other	
Ariz.	12	706	140	152	80	0	0
Calif.	35	4,540	275	230	274	105	0
Colo.	20	3,595	227	184	200	0	1
Idaho	12	576	86	88	40	0	0
Nevada	9	682	64	84	56	0	0
N. Mex.	23	905	125	128	40	8	0
Oregon	17	1,316	121	152	152	0	0
Utah	8	800	139	104	144	0	0
Wash.	11	1,073	76	100	40	0	0
Wyo.	14	2,398	105	80	36	0	3
Totals	161	16,591	1,358	1,302	1,062	113	4

Counties, Colorado in 1950. No general infestations were found in the State this year and the two specimens were the only ones collected. Table I summarizes the survey as conducted in the various Western states.

One very interesting result of the Wyoming survey was the finding of the imported European corn borer parasite *Sympiesis viridula* (Thomas) in one corn field of the Torrington area. The parasite has been liberated a number of times in the United States, but the nearest release to Torrington was about 400 miles away, in Nebraska.

In connection with the European corn borer survey, specimens of the southwestern corn borer were also collected. Specimens of this insect were submitted from Quay, Roosevelt, Otero, Bernalillo, Socorro and Valencia Counties, New Mexico; and Pima, Santa Cruz, Graham, and Maricopa Counties, Arizona. Although the insect was common in Arizona fields, no economic damage was noted. Later reports record the insect as being common in hegari fields near Chandler, Arizona.

In early October, light infestations of the southwestern corn borer, ranging from 4 to 20 percent damaged stalks, were found in three southwestern Missouri Counties, Newton, Jasper, and Barton. Delimiting surveys found the borer also in Barry, Stone, Lawrence, Dade, McDonald, Christian, and Vernon Counties of that State. Infestation ranged from one-fourth to one percent in the more northern counties to as high as 20 percent in extreme southwestern counties. The insect was found for the first time in Missouri in 1950 having been taken in McDonald County.

Spittlebug Survey in Ohio

DURING the second week in September a survey to determine the adult spittlebug population was conducted in Ohio by experiment station entomologists of that State. One hundred twenty four legume fields in 12 sections of the State were swept with a 15-inch insect net. Old stands of alfalfa with more than six inches of growth and new seedings of alfalfa were sampled. Fifty sweeps per field were taken.

With the criterion of one spittlebug per sweep as the number necessary to produce an economic population in 1954, the 12 sections of the State were classified into low, moderate, and high infestations. If 20% or less of the fields showed economic infestations, the area was classified as low; 50 percent economic infestation, received moderate classification, and with 70 percent of the fields carrying economic infestations, the classification was high.

The area of the State carrying a high rating was the central third extending to the northeastern corner with moderate infestations to the North, West and South while low infestations were found in the northwestern and southeastern sections of the State.

The report emphasized the fact that not all legume fields would need to be treated for spittlebugs. In the low and moderate areas, over one half of the legume fields would not need treatment. However, in all sections each field should be sampled before the need for treatment is determined.

Cotton Insects

ALTHOUGH the time for boll weevil damage for this season has passed, reports of their presence continue to be received. During early October adults and larvae were on the increase around the periphery of the cotton growing areas in Missouri. Reports received during the middle of October stated that very heavy populations were in fields in the Natchitoches, Louisiana area. The insects were still present in suitable North Carolina cotton fields. In South Carolina weevil damage was greater than any year since 1950.

Gin trash examinations for pink bollworm have been conducted in various cotton growing states during the past two months. Examinations in Alabama, Georgia, Mississippi, Arkansas, and on the West Coast of Mexico have been negative. Three larvae have been found in DeSoto Parish, Louisiana with indication that two of the specimens may have originated in Texas. DeSoto Parish is adjacent to Texas. Examinations continue in Texas with most of the northeast, north central and west central counties showing some increase over 1952. The most definite increases are west of a line from Waco to Dallas and north, however none of these increases are comparable to those experienced in south Texas during 1952.★★

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Chase Appoints Muller

W. J. Muller has been appointed manager of the Orlando sales office of the Chase Bag Co., Chicago, according to a recent announcement by R. N. Conners, executive vice president. Ralph Farnham, formerly of the Orlando office, has been transferred to the promotion department, where he will devote full time to "Saxolyn" open mesh and polyethylene promotion activities.

CFA Says "Buy Early"

Urging farmers of California and Arizona to "arrange now for the purchase of as much of their fertilizer needs for the immediate future as they can," the California Fertilizer Association is making an effort to aid manufacturers in the area in solving serious storage problems.

"Storage facilities of manufacturers and mixers are full," the CFA points out. "With no place to store additional output, they must slow down their operations. This can result in shortages when the peak period of demand arrives," the bulletin continues.

The Association points out that a general movement of currently available fertilizers to on-the-farm storage will make it possible to continue production at top capacity.

•

New Agricultural Mist Blower

A multi-purpose mist blower, said to be more adaptable than previous models used for applying insecticides, has been tested recently by The Connecticut Agricultural Experiment Station and the U.S. Department of Agriculture. The machine is suited for treating small orchards, small trees, nursery stock, row crops, grapevines and small fruits, and can also be used for broadcast spraying and mosquito control, according to reports. The machine was developed by a commercial concern, according to specifications drawn up by S. F. Potts, of the U.S.D.A.'s Bureau of Entomology and Plant Quarantine, and R. A. Spencer and Dr. R. B. Friend, of the Experiment Station's Entomology Department.

The new mist blower weighs only 200 pounds and can be mounted on a farm tractor, small trailer, or pick-up truck. It is already being manufactured by the company responsible for its development. It comes equipped with several different types of spray outlets.

The machine has been extensively tested in Connecticut for several seasons. It was found that, in addition to giving good insect control on row crops and nursery stock, the blower could be used for treating pests of small orchards, small fruits and grapevines. It is not suitable for treating shade trees more than 40 feet in height.

Descriptive literature is available from the Connecticut Station. Write for Bulletin 572, entitled, "Tests of a Light-Weight Mist Blower," The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven.

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Signed—Lawrence A. Long, Editor

Sworn to and subscribed before me this 21st day of September, 1953.

(Seal) Alice Christmas

(My commission expires March 30, 1955.)

COLEMAN

(Continued from Page 29)

cause their costs *per unit* of production are reduced substantially.

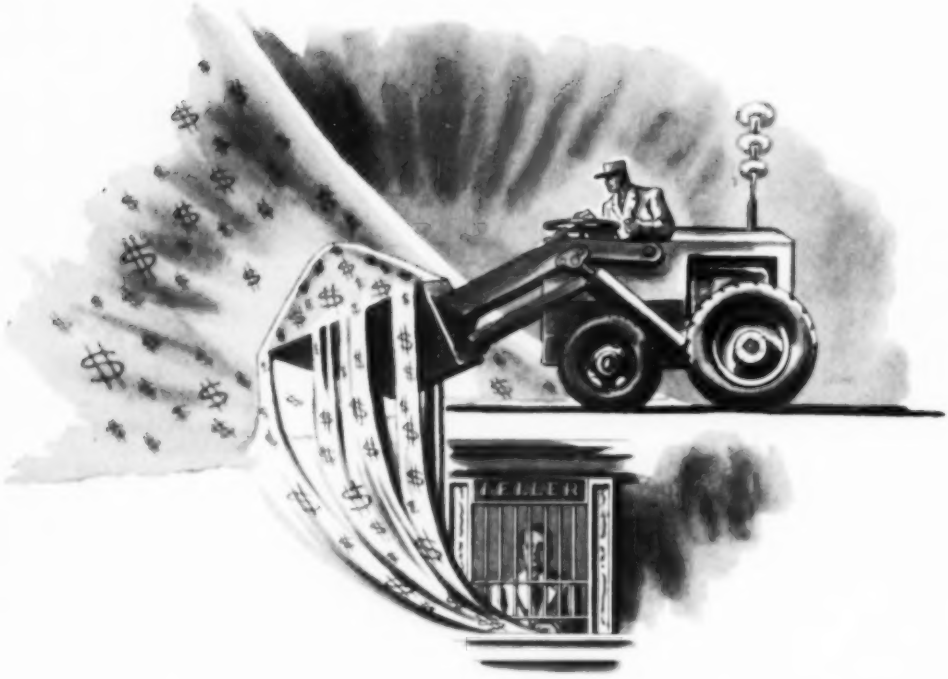
Take the State of Arkansas for example. A recent study shows that by following recommended fertilization practices, Arkansas farmers could realize the same net profit on 786 thousand acres of cotton as on the 1.9 million acres planted to cotton last year in that State. And they would achieve this same net profit on a total production of only about 786 thousand bales as compared with the 1.3 million bales harvested in 1952.

In the case of corn, the figures show that Arkansas farmers could make the same net profit from 10.2 million bushels grown on about 255 thousand acres as from the 13.9 million bushel output from the 929 thousand acres in corn last year—simply by following fertilization practices recommended by their State Agricultural Experiment Station. Essentially the same story applies to other important cash crops grown in the State, such as rice, soybeans and oats.

In other States where sufficient data are available to permit accurate estimates, the picture is the same. Following recommended fertilization practices can be a real solution to the surplus problem while permitting farmers to maintain their profits. This truly is a way to "have your cake and eat it."

Another result of such a program of particular importance to the future welfare of the nation is the fact that growing current food and fiber requirements on fewer acres permits retirement from cash crop production of millions of acres which need rebuilding. With population increasing as it is, we'll need these acres someday—need them badly. And they must be in tip-top shape if food and fiber requirements of future generations are to be met. Fertilizer is one of the more important ingredients in this rebuilding job, and will be available for increasing production when this is needed.

We certainly must conclude that proper use of fertilizer is a key to a healthy farm economy and a balanced food supply whether we need more farm production or less—whether we have shortages or surpluses. Would not a continuing solution to our "farm problem" be made more simple if, through some miraculous means, practical application of the results of agricultural research could be made on every American farm?



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Technical BRIEFS

Outlook on Fly Resistance to Insecticides

by A. W. Lindquist
BEPQ, U.S.D.A.

AFTER several years of intensive use of DDT, house flies have developed a high resistance to this insecticide. In some areas DDT has not been used much for fly control for two or three years.

Since laboratory colonies of flies have been found to lose resistance when reared in an insecticide-free environment, it was thought likely that flies in nature might gradually lose resistance after the use of DDT was discontinued. Some loss of resistance to DDT has been reported in certain parts of the country, but as yet there is no evidence of this in the vicinity of Orlando, Florida. It is believed that old residues of DDT in many barns and the occasional use of lindane and methoxychlor have been largely responsible for the flies maintaining their high resistance to DDT.

The Orlando laboratory, however, has observed seasonal decline in resistance of house flies to lindane. This occurs during the winter in Florida. J. B. Gahan and H. G. Wilson collected house flies from five dairy barns in the fall of 1951 and again in the spring of 1952, for toxicity tests. Female flies were exposed for various periods on plywood panels treated at the rate of 25 mg. per square foot with DDT or lindane. After exposure, the flies were removed and held for a 24-hour mortality count. The flies tested in September 1951 were many times more resistant to lindane than those tested the following April. The spring collection of flies were about as susceptible as the reared colony, but by early fall resistance was again high. The flies were highly resistant to DDT at each test period.

Again in May 1953 collections showed that flies from three of the five barns were less resistant to lindane than those collected in September 1952. In one of the barns there was no difference between fall and spring collections, but in the one barn where TEPP-molasses fly baits had been applied regularly as floor treatments throughout the winter, the flies were more resistant to lindane in the spring. This was the only reversal of resistance during the two-year study. Again there was no change in the level of resistance to DDT.

There does not appear to be any ready explanation of the loss of resistance to lindane by these flies during the winter months.

•

Soil Nutrients for Wheat

Wheat is a weak feeder. For most rapid growth, nutrients must be in quickly available form. The plant makes most of its growth during fall and early spring, when the soil is cool. Adequate supplies of nutrients at time of seeding will promote fall growth, prevent winter injury and increase stand. Winter killing is one of the principal causes of low yields of small grains.

A bushel of wheat contains about 1¼ pounds of nitrogen. A 35-bushel crop requires about 60 pounds of nitrogen, 25 pounds of phosphate and 35 pounds of potash. Only in the most favorable seasons can our best soils deliver this quantity of nutrients without help from plant food applications.

When soil is summer fallowed, a fertilizer mixture carrying 8 to 12 pounds of nitrogen is desirable. Except where soils are sandy and leaching losses occur, fall or winter application of nitrogen is desirable. *The Announcer* Univ. of Mo., October 1953, #10.

•

Cabbage Worms Resist DDT

In the September newsletter of the Kansas State Horticultural Society, F. L. McEwen and R. K. Chapman report that cabbage worms in the Racine-Kenosha truck crop area have become resistant to DDT. Dilan, at one-half pound per acre gave good control where DDT would not do the job. DDT had worked well for five years in the cabbage growing area, but had little effect in 1951, and since then.

•

Alanap for Weed Control

This is the first year that Alanap has been tried by farmers for weed control in vine crops. The Cornell College of Agriculture recommended last winter that it should be used on a trial basis on vine crops. Growers who used Alanap on vine crops had varying results. Some of them had sprayed part of a field and wished they had sprayed the whole field. Others had sprayed part of the field and wished they had sprayed none of it.

Some of the difficulty was due to a misunderstanding of the use and adaptability of the material. At the recommended rate of four pounds per acre, Alanap kills only germinating seeds. If it is applied after the weeds are up, there is usually little or no weed control. On the other hand, if it is applied at the beginning of a long dry spell when the weed seeds do not germinate, the effectiveness of the Alanap will be gone before the weeds germinate and poor weed control results. Some of the poor results were

due to dry spells following application which did not permit the weed seeds to germinate.

At several places some injury to the vine crop due to the Alanap spray was observed. Among the vine crops the cucumber is one of the most resistant and squash, one of the most susceptible to Alanap injury. One field of squash and pumpkin had been severely injured by Alanap. The grower said that he had applied the material at the rate of four pounds per acre when the squash and pumpkins were just beginning to spread. Even though it was applied at four pounds per acre, the amount applied to the plant was much greater than that because he had used a regular row-crop sprayer. The ordinary row-crop sprayer is designed to get a maximum amount of spray material on the plant, because it is used for fungicides and insecticides. It is not a good piece of equipment to use for weed control sprays because it concentrates the material on the plant. The regular weed sprayers apply the four pounds of Alanap evenly over the whole surface of the ground with a minimum concentration on the plants themselves.

It will take some time before all the growers will completely understand the use of Alanap. It does in many cases provide excellent weed control in vine crops. One of the best cases of weed control observed was due to Alanap in a melon field. The field was practically weed free and had never been hoed. Shortly after setting the plants, the area around the plants was sprayed with a knapsack sprayer using Alanap at the rate of four pounds per acre. This controlled the weeds that could not be reached with the cultivator. The melons were irrigated and since ample moisture was available, the weed seeds germinated rapidly and were killed.

Then, after the last cultivation the field was sprayed with about two and a half pounds of Alanap per acre. This controlled all the weeds that would have gotten a start before the vines covered the ground. *Cornell Veg News*, 4, #11, October 1953.

Insecticide Studies Reported

More than seventy esters of propionic acid were tested as insecticides in the laboratories of the U.S.D.A., B.E.P.Q., Anaheim California from March to December 1951. Results of the tests are summarized below. The samples were tested first for insecticidal action. When used in the form of dusts, dilutions were to ten percent in pyrophyllite; sprays or dips were diluted to five per cent or less on a weight per volume basis in acetone or water.

Fifty-six compounds caused greater than 74 per cent mortality to one or more species of insects when tested as sprays or dips. 2,4-dinitro-6-biphenyl, pentabromophenyl, and pentachlorophenyl propionates were the most effective acaracides, all causing over 75 per cent mortality of the two-spotted spider mite when tested as 0.05 per cent sprays. Against the armyworm, 2,4-dinitro-6-biphenyl and pentachlorophenyl propionates were effective as 0.5 per cent sprays, thus making these two compounds the only ones effective as low-concentration sprays against more than one species of insect. o-Cyclohexylphenyl and p-tert-butylphenyl propionates were effective when used as 0.5 per cent sprays against the large milkweed bug; and p-bromophenyl, o-chlorophenyl, p-chlorophenyl, and 2,4,5-trichlorophenyl propionates were effective as 0.5 per cent dips against the pea aphid.

Thirteen compounds caused greater than 74 per cent mortality to one or more species of insects when tested as 10 per cent dusts. Three compounds were found to be effective against the armyworm and the two-spotted spider mite. They were 2-biphenyl, pentachlorophenyl, and 2,-3,4,6-tetrachlorophenyl propionates. 6-tert-butyl-m-tolyl propionate was also effective against the two-spotted mite. The following compounds were effective against larvae of the celery leaf tier: Dipropionates of 2,4'-dihydroxybenzophenone, 4,4'-dihydroxybenzophenone, and 1,5-naphthalenediol, and 2-bromo-4-tert-butylphenyl, p-cyclohexylphenyl, and m-ethylphenyl propionates. One hundred per cent mortalities of second-instar pea aphids resulted from the use of 2-naphthyl propionate and p-nitrophenyl propionate. The latter was also effective as a 5 per cent dust. None of the compounds tested as dusts against the large milkweed bug were effective.

Of 24 effective compounds tested for phytoxicity, 2,4,5-trichlorophenyl propionate was the only one that caused moderate to severe injury. Severe injury resulted to foliage of beans, beets, and corn, and moderate injury to cabbage. o-bromophenyl propionate caused slight injury to radish foliage, and p-bromophenyl caused slight injury to corn foliage.

Complete results of the above studies are tabulated in the August 1953 Bulletin #E-862, U.S.D.A., B.E.P.Q.

•

Hormones Aid Plant Growth

The size of strawberries can be increased about 30 per cent by the use of hormone spray, according to Drs. R. F. Carlson and H. B. Tukey, reporting at the meeting of the American Institute of Biological Sciences. Beta naphthoxyacetic acid was used at the rate of 5 grams in 25 gallons of water, applied 14 to 18 days after the flowers were out, and the berries were in the white stage. It is reported that dry weather may retard the effect of the hormones.

•

Antibiotic Fungicides

Streptomycin in a water spray has been found effective in arresting and curing the halo blight of bean plants, and in arresting the fireblight disease of pear and apple trees.

Experimental work on the bean plots was done by the U. S. Department of Agriculture in Beltsville, Maryland. A water solution of one per cent streptomycin sulfate gave almost 100 per cent protection against the disease with three sprayings. The first application was made when the first leaves were three-fourths open and the other two sprays at weekly intervals thereafter.

Experiments with a combination of streptomycin and terramycin on apple trees were made by Dr. R. N. Goodman of the Univ. of

Missouri. Dosages ranging from 100 to 500 parts of antibiotic per million of water were effective on 112 trees applied during bloom and for three employed in the study. Sprays were weeks after bloom. It is reported that trees which were infected naturally in the orchard required less of the antibiotics to control the disease than did those inoculated with the disease in greenhouse studies.

•

Cotton Pest Studies

A study of the effects of ten insecticides on predaceous insects associated with cotton showed that all the compounds investigated reduced the populations of the beneficial predators. Compound 711 (isodrin) at the rate of .2 lbs. toxicant per acre produced the lowest mortality of predators. EPN and parathion consistently eliminated the predators. Other compounds tested were aldrin, chlordane, compound 269 (endrin), DDT, dieldrin, gamma-BHC, heptachlor, toxaphene, and compound 923 (2, 4 - dichlorophenylbenzenesulfonate). *J. Econ. Entomology* 45, 828-33 (1952).

•

DDT Effect on Strawberries

Strawberries are highly sensitive to DDT, so that merely dusting the rows of young mother and runner plants, as for insect control, leaves enough DDT in the surface soil to interfere seriously with the formation of daughter plants. It is reported that rooting at the nodes of the runner may be reduced by the DDT in the surface soil through which the young roots must pass if they are to become established and support a daughter plant. September Newsletter, Kansas State Horticultural Society.

•

Fungicides For Figs

One of the important factors limiting the production of Kadota figs in California is the development of surface mold and decay of the fruit during the latter part of the harvest season. The surface mold, which appears as smudgy areas, is due largely to 1 or more species of *Cladosporium* and *Alternaria*, whereas the shallow surface rot is caused almost entirely by *Alternaria*. Surface mold usually develops only on the upper and outer surfaces of the most exposed fruit, where the greatest condensation of moisture occurs. Alternaria rot also is generally more prevalent on the most exposed surface of the fruit. In an attempt to control these disorders, fungicidal sprays were applied early in September, when a trace of surface mold was present, and 2 weeks later when the mold was more pronounced. Two applications were better than 1 and the late spray was more effective than the early one. Where 2 applications of manzate, ziram, zineb, zinc coposil, and Vancide 51 plus zinc sulfate were applied the disorders were reduced by approximately 50 per cent. Captan and Phygon were somewhat less effective, and Crag 341 was little better than the check. Manzate, Phygon XL, and Crag 341 were somewhat phytotoxic.

Report by Harley English at the 6th annual meeting of the Pacific Division of the American Phytopathological Society, Santa Barabara, Calif., June, 1953.

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Control of Soil Reinfestation

A major problem following soil disinfestation is recontamination by disease organisms. Since the first organisms returning after treatment dominate the soil flora, an attempt was made to control reinfestation by introducing non-pathogenic organisms. Untreated soil which decreased the spread of *Rhizoctonia solani* yielded organisms which were tested as retardants. Species of *Chaetomium, Pestalozzia, Myrothecium, Penicillium, Trichoderma,* and an unidentified Botrytidae when added to flats of steamed, high organic, sandy loam mixture in the glasshouse retarded the spread of Rhizoctonia damping-off of peppers. The last 4 named prevented the development of damping-off when retardant and *Rhizoctonia* were added at time of seeding. The inhibitory action of *Myrothecium* sp. diminished after a month in flats of growing plants. Growth of pepper seedlings in flats inoculated with the above fungi was slightly to moderately retarded, the severity depending on the fungus used and the type and amounts of soil amendments added. Data of this type suggest the possibility of adding a group of organisms to soil, in order to prolong and buffer their joint inhibitory action on pathogens under a wide range of conditions.

Report by J. Ferguson, 6th annual meeting of American Phytopathological Society, June, 1953.

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Literature Available

The following list reviews a series of bulletins on fertilizer, insecticide and fungicide recommendations, controls, etc. For the most part, these bulletins and reports are prepared by the various state agricultural experiment stations, and copies may be obtained by writing directly to the respective stations.

GUIDE TO FERTILIZER USE *by H. R. Meldrun, J. A. Stritzen and and H. B. Chaney.* A guide to planning a fertilizer program. It includes suggestions for fertilizers according to soil areas of Iowa. 16 pages. Bulletin #Pm 193, Iowa Agricultural Experiment Sta., Ames, Iowa.

CAUSES OF OUTBREAKS OF STORED GRAIN INSECTS *by R. T. Cotton, H. H. Walkden, G. D. White and D. A. Wilbur.* Report on various species found in grain, damage to stored grain, origin of insect outbreaks, factors governing the abundance of insects, effects of temperature and moisture, treatment of stored wheat and corn 36 pages. Bulletin #359, July 1953, Kansas Agricultural Experiment Station. Manhattan Kansas.

INSECTS: THEIR SECRET WORLD by *E. Chessman.* A new book of 246 pages, priced at $3.00. A popular-type book on the life of insects.

SOILS AND FERTILIZERS FOR FLORIDA VEGETABLE AND FIELD CROPS. Presents suggested applications for flat pine lands and rolling uplands, and gives a generalized map of Florida soil areas. Bulletin 514, Agricultural Experiment Station, Gainesville, Fla.

SWEET CORN PRODUCTION ON THE SANDY SOILS OF THE EAST COAST. Contains cultural suggestions and recommendations for diseases and insect control. Bulletin #520, Agricultural Experiment Sta., Gainesville, Fla.

MORE EFFICIENT USE OF FERTILIZER. 20 pp, Bulletin #B531, Agricultural Experiment Station, Univ. of Mo., Columbia, Mo.

FERTILIZER INSPECTION AND ANALYSIS, 64 pp, Bulletin B585, Agricultural Experiment Station, Univ. of Mo., Columbia, Mo.

TOMATO DISEASES, circular by Kansas State College, Manhattan, Kansas.

CABBAGE DISEASES . . THEIR CONTROL, circular by Kansas State College, Manhattan, Kansas.

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INDUSTRY *Patents*

The information below is furnished by patent law offices of

LANCASTER, ALLWINE & ROMMEL

402 Bowen Building
Washington 5, D. C.

The data listed below is only a brief review of recently issued pertinent patents obtained by various U. S. Patent office registered attorneys for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommell by sending 50c for each copy desired. $1.00 for Canada. They will be pleased to give you free preliminary patent advice.

2,648,464. FERTILIZER DISTRIBUTOR. Patent issued August 11, to William J. Weeks, Florence, S. C. A fertilizer distributor comprising a generally horizontal frame, a hopper for receiving the fertilizer and arranged above the frame and and secured thereto, a substantially vertical hollow partition arranged within the hopper substantially at its transverse center and including sides and a closed top which is arranged at an elevation a considerable distance beneath the top of the hopper, said partition dividing the hopper into transversely spaced compartments, depending hopper compartment extensions secured to the frame and transversely spaced and having their upper ends leading into the lower ends of the hopper compartments, the hollow partition and the depending compartment extensions forming a substantially vertical chamber closed at its top and sides throughout the length of said sides, a transverse shaft arranged beneath the frame and extending through the hopper compartment extensions and having its ends mounted upon the frame, a single ground wheel arranged at substantially the transverse center of the hopper and disposed within said chamber, the sides and top of the chamber preventing the fertilizer from passing into the chamber and contacting with the wheel, rotary fertilizer feeding elements mounted upon the shaft and arranged within the depending hopper compartment extensions, means forming discharge openings at the bottom of the depending hopper compartment extensions, and handles arranged at the rear of the frame and secured thereto.

2,648,594. MANUFACTURE OF AMMONIUM SULFATE FROM REFINERY WASTES. Patent issued August 11, to Dan A. H. Olson, Huntington Park, Calif., assignor to Socony-Vacuum Oil Co., Inc., New York. A method of manufacturing ammonium sulfate which includes: continuously introducing to a reaction zone ammonia, steam, and a material containing sulfuric acid, oil, and oil-soluble contaminants; withdrawing from said reaction zone a suspension of aqueous ammonium-sulfate solution and liquid oil, said liquid oil including the less volatile portion of said contaminants; withdrawing from said reaction zone steam with vapors of volatile contaminants, said withdrawal of steam being sufficient in amount to yield concentration of at least 35% ammonium sulfate by weight in said withdrawn aqueous solution; maintaining sufficient liquid water in said reaction zone to prevent crystallization of ammonium sulfate therein; and separating said withdrawn aqueous solution from said liquid oil.

2,648,621. CHLORINATED N-ETHYL ACETANILIDE INSECTICIDE SPRAY COMPOSITION. Patent issued August 11 to Henry John Gerjovich and Michael Pisoan, Boulder, Col., assignors to The Chemical Foundation, Inc., New York. An insect spray composition comprising essentially an insect spray base paraffinic hydrocarbon solvent containing a toxic amount of a mixture of mono, di and trichloro n-ethyl acetanilide.

2,649,196. PACKAGED FERTILIZER ELEMENTS. Patent issued August 18, to Louis Wayne Arny, Wayne, and Henry W. Stevens, Phoenixville, Pa. A package comprising: the charge of a mixture of soil replenishing elements, said elements comprising soluble compounds of one or more of copper, boron, zinc, manganese and iron, and a container for said charge, said container comprising an inner imperforate moisture-pervious ply and an outer perforated moisture-resistant ply, said package being formed with a broad major surface and being relatively thin in the direction normal to said surface.

2,649,363. REGULATION OF THE GROWTH OF UNDESIRED VEGETATION. Patent issued August 18, to Arthur W. Swezey, Garden Grove, Calif., assignor to Dow Chemical Co., Midland, Mich. A method for the control of undesired plant growth which comprises contacting the leaf surfaces of the plants with a haloacetic acid compound of the group consisting of (1) monohaloacetic acids of the formula:

$$X{-}CH_2{-}\overset{\overset{O}{\|}}{C}{-}OH$$

wherein X represents one of the halogens chlorine, bromine and iodine, and (2) their water-soluble salts, such compound being employed at a dosage exerting a phytotoxic action against the plant growth concerned.

2,649,364. MATURING OF CROPS. Patent issued August 18, to Richard N. Raynor, Danville, and Doane Stewart, Sacramento, Calif., assignors to Dow Chemical Co., Midland, Mich. A method for promoting the maturing of crops and facilitating of harvest which includes the step of applying to the crops near the end of their normal growing season a water-soluble compound of the group having the formula

$$(X{-}CH_2{-}\overset{\overset{O}{\|}}{C}{-}O{-})_n{-}W$$

wherein X represents a halogen of the group consisting of chlorine, bromine and iodine. W represents one of the group consisting of hydrogen and a salt-forming ion, and n represents an integer equal to the equivalency of W, such compound being employed at a dosage sufficient substantially to accelerate the maturing of the crops.

2,649,365. MATURING OF CROPS. Patent issued August 18, to Richard N. Raynor, Danville, and Doane Stewart, Garden Grove, Calif., assignors to Dow Chemical Co., Midland, Mich. A method for promoting the maturing of crops and facilitating of harvest which includes the step of applying to the crops near the end of their normal growing season a water-soluble compound of the group having the formula

$$(X{-}R{-}\overset{\overset{O}{\|}}{C}{-}O{-})_n{-}W$$

wherein X—R is a monohaloethyl radical, X represents a halogen of the group consisting of chlorine, bromine and iodine, W represents one of the group consisting of hydrogen and a salt-forming ion, and n represents an integer equal to the equivalency of W, such compound being employed at a dosage sufficient substantially to accelerate the maturing of the crops.

2,649,397. FUNGICIDAL COMPOSITIONS AND METHOD OF FUNGUS CONTROL COMPRISING HYDROCARBYL-SUBSTITUTED PYRIMIDINES. Patent issued August 18, to Seaver A. Ballard, Orinda, Calif., assignor to Shell Development Co., San Francisco. A fungicidal concentrate composition containing a substituted tetrahydropyrimidine having only hydrocarbyl substituents and having a hydrocarbon group of from 10 to 23 carbon atoms attached directly to the 2-position of the tetrahydropyrimidine ring, said composition also containing a surface active agent suitable for dispersing said composition in water.

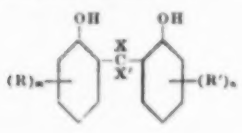
2,650,186. RODENTICIDAL COMPOSITIONS. Patent issued August 25, to

Gerhard Hecht, Wuppertal-Vohwinkel, Hans Henecka, Wuppertal-Elberfeld, and Marianne Meisenheimer, Leverkusen-Bayerwerk, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany. A process for preparing a highly toxic, crystalline, condensation product having the empirical formula $C_7H_5O_2N_2S)_2$ and a decomposition point between 255 and 260° C., which comprises reacting one mol of sulfuryl amide with two mols of formaldehyde in an amount of a concentrated aqueous mineral acid substantially greater than the total amount of said reactants, and separating the crystalline precipitate formed from the solution.

2,650,240. Trichloro Methyl Thiocyanate and Process for Preparing Same. Patent issued August 25, to John F. Olin, Grosse Ile, Mich., assignor to Sharples Chemicals, Inc. A process for the manufacture of trichloromethyl thiocyanate, which comprises mixing acetic acid, an alkali metal cyanide, and trichloromethanesulfenyl chloride, and agitating said mixture until trichloromethyl thiocyanate is produced.

2,650,660. Method of Adjusting the Concentration of Ammonium Nitrate Solutions. Patent issued September 1, to Tom E. Martin, Bartlesville, Okla. and Edward Edmunds, Jr., Albuquerque, N. M., assignors to Phillips Petroleum Co. A method for adjusting the concentration of an aqueous ammonium nitrate solution which comprises passing a dilute solution of aqueous ammonium nitrate of at least a 65 weight per cent concentration which is at superatmospheric pressure into a vacuum evaporator at a temperature above the boiling point of a more concentrated solution maintained in the evaporator, said evaporator being maintained at a constant subatmospheric pressure of six inches of mercury absolute, introducing cooling water to said vacuum evaporator in a volumetric ratio of 5 to 20 volumes of water per 100 volumes of ammonium nitrate solution as required to compensate for a temperature rise, and maintaining the solution in said vacuum evaporator at a predetermined boiling point at the constant subatmospheric pressure by controlling the amount of water introduced, thereby effecting controlled evaporation of water whereby an ammonium nitrate solution of the desired concentration is continuously produced.

2,651,572. Preservation of Forage Crops with Phenol Derivatives. Patent issued September 8, to Emanuel M. Bickoff, Berkeley, Calif., assignor to the U.S.A. as represented by the Secretary of Agriculture. The process of stabilizing a forage crop which comprises incorporating therewith a compound containing two alkylphenol nuclei linked at their 2 positions to a bivalent aliphatic redical, said compound having the formula:

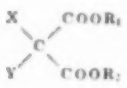


wherein R and R' are alkyl radicals, m and n are integers from 1 to 4, and X and X' are each a member of the group consisting of hydrogen and alkyl radicals.

2,651,579. Halogenated Thiophene Pesticide. Patent issued September 8, to Ralph E. Plump, Haddonfield, N. J., assignor to the Pennsylvania Salt Mfg. Co., Philadelphia. A pesticidal composition comprising the compound:

in which "R" is selected from the group consisting of hydrogen and halogen and combinations thereof, at least one "R" being halogen, admixed with a pesticidal adjuvant as a carrier therefor.

2,651,590. Fumigant Composition and Process. Patent issued September 8, to Kenneth S. Karsten, Westport, Conn., assignor to R. T. Vanderbilt Co., Inc., New York. A pesticidal composition of matter comprising as an active ingredient at least one compound of the formula:



wherein X is selected from the group consisting of bromine and chlorine, wherein Y is selected from the group consisting of hydrogen, bromine and chlorine and wherein R_1 and R_2 are alkyl radicals having from 1 to 4 carbon atoms and a solid adsorbent carrier therefor.

2,651,591. Anticoagulant Rodenticide. Patent issued September 8, to Geza S. Dalmar, Baie d'Urfe, Quebec, and Ernest Neil Maccallum, Lachine, Que. Canada, assignors to Delmar Chemicals Ltd., Lachine, Que. As a new product, 3 - (alpha - (p - acetamino) - phenyl-beta-acetylethyl)-4-hydroxycoumarin. As a rodenticide composition, a food product as an edible carrier and as a toxic ingredient at least 0.025% of 3-(alpha-(p-acetamino)-phenyl - beta - acetylethyl)-4-hydroxycoumarin.

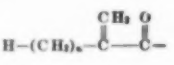
2,651,619. Stabilization of Soils. Patent issued September 8, to Victor F. B. de Mello, Sao Paulo, Brazil and Ernst A. Hauser, Brookline and Thomas W. Lambe, Cambridge, Mass., assignors to Research Corporation, New York. A method of forming a stabilized structure composed essentially of natural soil and a stabilizer therefor, which consists essentially of admixing with the natural soil a monomeric water soluble acrylate of a polyvalent metal, and a reduction-oxidation catalyst, forming the mixture into the desired structural form, and thereafter polymerizing the monomeric acrylate in the presence of sufficient moisture to at least partially ionize said acrylate and said catalyst, the polymerization being carried out at atmospheric temperature and pressure, to produce a stable soil-polymer-water structure in said desired form.

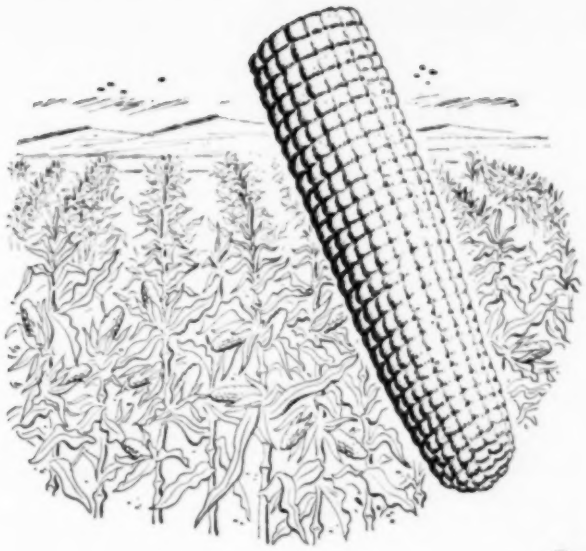
2,651,883. Pelleted Seed Product. Patent issued September 15, to Ross M. Hedrick and David T. Mowry, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis, Mo. A pelleted seed product comprising a seed having adhered thereto a composition including a polymeric water-soluble polyelectrolyte having a weight average molecular weight of at least 10,000, and having a structure derived by the polymerization of a mono-olefinic compound through the aliphatic unsaturated group.

2,651,885. Method of Conditioning Agricultural Soil and Growing Plants Therein. Patent issued September 15, to Ross M. Hedrick and David T. Mowry, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis. The method of growing plants which comprises establishing a living plant structure in a surface soil subject to slaking and erosion which soil has been previously cultivated to form unstable aggregates and subsequently to the cultivation stabilizing the aggregates by contacting them with a water solution of a synthetic water-soluble polymeric polyelectrolyte containing a substantially linear structure derived by the polymerization of a monolefinic compound through aliphatic carbon to carbon unsaturation and having a molecular weight such as to improve the water-stability of the aggregates in the said soil.

2,651,886. Method of Conditioning Agricultural Soil and Growing Plants Therein. Patent issued September 15, to David T. Mowry and Ross H. Hedrick, assignors to Monsanto Chemical Co., St. Louis, Mo. A method of conditioning agricultural soil with polymers having weight average molecular weights greater than 10,000, and a substantially linear structure derived by the polymerization of a mono-olefinic compound through the aliphatic unsaturated group, said polymer being selected from the class consisting of water-soluble polyelectrolytes and polymers which react with soil moisture to generate water-soluble polyelectrolytes, which comprises spreading the solid polymer on a dry soil, cultivating the soil to disperse the polymer in the soil, and saturating the cultivated soil with water.

2,652,322. Herbicides. Patent issued September 15, to Ross M. Hedrick and David T. Mowry, assignors to Monsanto Chemical Co., St. Louis, Mo. A solid composition comprising a herbicide and a water-soluble polyelectrolyte having a molecular structure derived essentially by the polymerization of a mono-olefinic compound through aliphatic unsaturated groups, said polyelectrolyte being a polymer of at least one compound containing the molecular grouping





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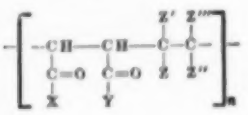
and having the property of imparting water stability to soil aggregates.

2,652,323. HERBICIDES. Patent issued September 15, to David T. Mowry and Ross M. Hedrick, assignors to Monsanto Chemical Co., St. Louis, Mo. A solid composition comprising from 0.05 to 20 percent by weight of a herbicide and from 80 to 99.95 per cent of a carrier consisting of a water-soluble copolymer having numerous recurring units of the following structure:



wherein X and Y are radicals selected from the group consisting of —OK, —ONa, —ONH$_4$, —ONRH$_3$, —ONR$_2$H$_2$, ONR$_3$H, —ONR$_4$, —OH, —NH$_2$, —OR, —OCH$_2$NR$_2$, —OCH$_2$CH$_2$NR$_2$, —NCH$_2$CH$_2$NR$_2$, —NHR and —NR$_2$, not more than one of the X and Y radicals being —OR; and wherein Z, Z', Z'', and Z''' are radicals selected from the group consisting of —C$_n$H$_{2n}$, —OCOH, —OCOCH$_3$, —OR, —COOR, —COOH, —CH$_3$, —OH, Cl and hydrogen, at least two of said groups being hydrogen, not more than one of said groups being of the group consisting of —OCOCH$_3$, —OCOH, —OH, —C$_n$H$_{2n}$, —OR, —COOH and —COOR, all of the radicals of the group consisting of Cl and CH$_3$ being attached to the same carbon atom, R being an alkyl radical having up to four carbon atoms; and wherein n is an integer indicative of the extent of polymerization; and wherein X and Y together may be —O—, and may also be —O—Ca—O—, said polymer having a structure derived substantially entirely by polymerization of mono-olefinic compounds.

2,652,337. FUMIGANT COMPOSITIONS CONTAINING COMPLETELY HALOGENATED BROMOCHLOROMETHANES HAVING AT LEAST TWO CHLORINE ATOMS. Patent issued September 15, to John A. Pianfetti, S. Charleston, W. Va., Roy Melvin, Dobbs Ferry, N. Y. and Hilton H. Earle, Jr., Belle Glade, Fla., assignors to Food Machinery & Chemical Corp. A volatile fumigant composition containing by weight between 75% and 98% of a liquid chlorinated hydrocarbon of not more than two carbon atoms, having a boiling point below 150° C., and between 2% and 25% of a completely halogenated bromochloromethane selected from the group consisting of bromotrichloromethane and dibromodichloromethane.

2,652,355. FUNGICIDES. Patent issued September 15, to Nicholas Ercoli, Milan, Italy and Gijsbertus van Wessem, Harrison, N. Y., assignors to Warner-Hudnut, Inc. A fungicidal composition comprising, as an essential active ingredient γ-(p-bromphenoxy)-propyl thiocyanate and a carrier therefore, the proportion of the active essential ingredient being within the range of about 0.05 to about 3.00 percent by weight of the combined weight of said ingredient and said carrier, said composition being adapted for application to the human skin for control of pathogenic organisms thereon.

2,653,077. PRODUCTION AND RECOVERY OF AMMONIUM SULFATE. Patent issued September 22, to Robert S. Ogilvie, Bartlesville, Okla., assignor to Phillips Petroleum Co. A process for the production and concentration of ammonium sulfate which comprises, passing a water solution of ammonium sulfate containing from 10 to 30 weight per cent ammonium sulfate into the upper ⅔ portion of a liquid zone contained in a reaction zone, said reaction zone containing a vapor zone above said liquid zone, burning within said liquid zone a combustible mixture of fuel gas, having a heating value of from 750 to 1250 B.t.u./ft.^{3} net at 60° F. and 760 mm. of mercury, and air, said air being present in said mixture in an amount not exceeding 2% volume per cent more than that required to completely combust said fuel gas, directly contacting said water solution of ammonium sulfate and resulting hot products of said burning in said liquid zone so as to evaporate water from said solution, withdrawing water vapor from said vapor zone, introducing gaseous ammonia having a purity of at least 90 weight per cent into the lower ⅓ portion of said liquid zone, introducing sulfuric acid having a purity of at least 90 weight per cent into the lower portion of the upper ⅔ portion of said liquid zone, reacting ammonia with sulfuric acid in said liquid zone to produce ammonium sulfate, withdrawing a water solution of ammonium sulfate from the lower portion of said liquid zone containing from 30 to 50 weight per cent ammonium sulfate, such water solution containing no crystallized ammonium sulfate, introducing said withdrawn ammonium sulfate solution into the upper ⅔ portion of a liquid zone contained in a concentration zone, said concentration zone containing a vapor zone above said liquid zone, burning within said liquid zone a second combustible mixture of fuel gas, having a heating value of from 750 to 1250 B.t.u./ft.^{3} net at 60° F. and 760 mm. of mercury, and air, directly contacting said last-mentioned ammonium sulfate solution and resulting hot products of said last-mentioned burning in the last said liquid zone so as to evaporate water, withdrawing water vapor from the upper portion of the last said vapor zone, and withdrawing an ammonium sulfate-water slurry from the bottom portion of the last said liquid zone containing from 75-80 weight per cent total ammonium sulfate.

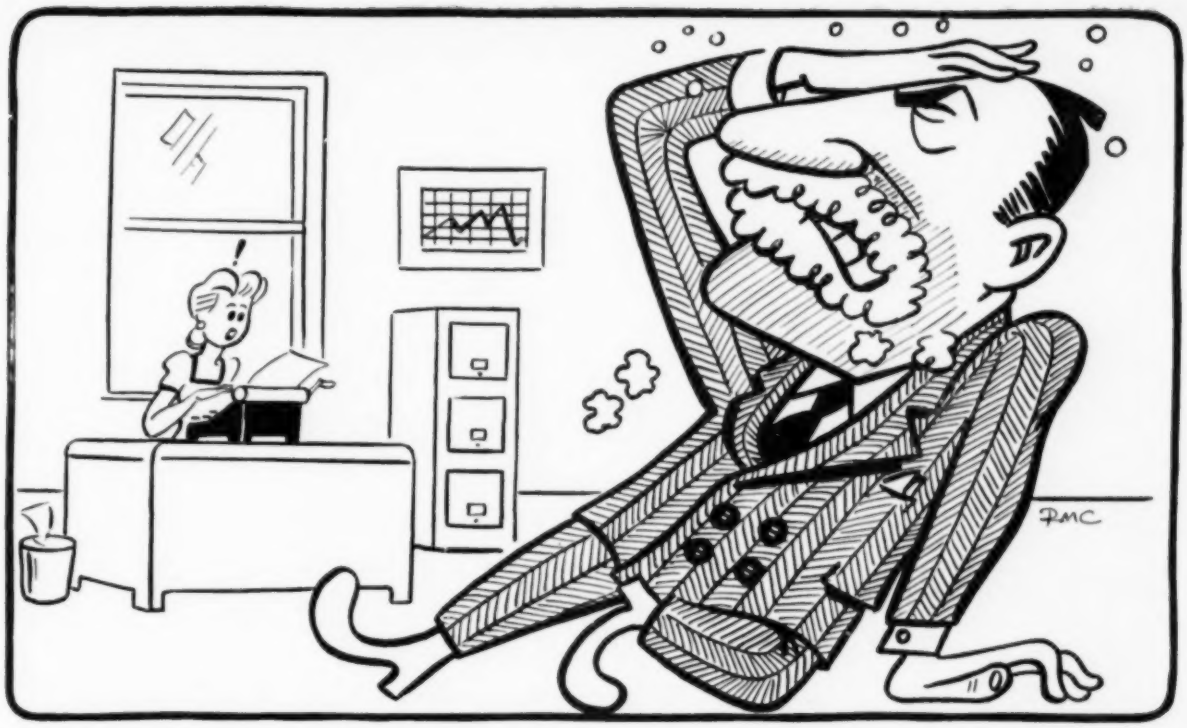
2,653,391. METHOD FOR DRYING AMMONIUM NITRATE AND LIKE MATERIALS. Patent issued September 29, to Edward Edmunds, Jr., Albuquerque, N.M., assignors to Phillips Petroleum Co. As a method for drying granule ammonium nitrate containing water a three stage process which comprises a predrying stage, a drying stage and a cooling stage, with the temperature of drying air in each stage being automatically controlled before contact with said granule ammonium nitrate, and with the rate of flow of said drying air past said granule ammonium nitrate being regulated automatically in each stage by controlling the temperature of said drying air after contact with said granule ammonium nitrate automatically in response to and to compensate for any variation, and wherein the temperature of said drying air before contact with said granule ammonium nitrate is maintained at 75° C. in said predrying stage, 145° C. in said drying stage, and 21° C. in said cooling stage, and wherein the temperature of said drying air after contact with said granule ammonium nitrate is maintained at 65° C. in said predrying stage, 75° C. in said drying stage, and 37° C. in said cooling stage, and wherein said granule ammonium nitrate is introduced into said predrying stage at a temperature of 75° C. and containing 3.5 to 4.5 weight per cent water, and wherein said granule ammonium nitrate is withdrawn from said predrying stage and introduced into said drying stage at a temperature of 65° C. and containing substantially 2.75 weight per cent water, and wherein said granule ammonium nitrate is withdrawn from said drying stage and introduced into said cooling stage at a temperature of 80° C. and containing substantially 0.5 weight per cent water, and wherein said granule ammonium nitrate is withdrawn from said cooling stage at a temperature of 38° C. and containing substantially 0.3 weight per cent water.

2,653,864. METHOD OF DESTROYING PLANTS. Patent issued September 29, to Arthur H. Schlesinger, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis. The method of destroying undesirable plants which comprises applying to said plants a toxic quantity of a herbicidal composition having the formula:

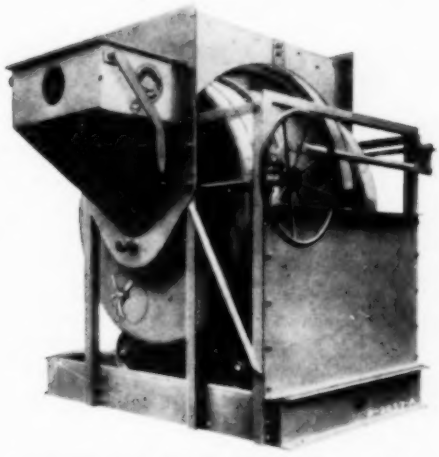
in which R and R' are selected from the class consisting of hydrogen and alkyl radicals of from 1 to 5 carbon atoms, said compound being present in said composition in a quantity which is toxic to plant life.

2,653,865. HERBICIDES. Patent issued September 29, to Milton Kosmin and Arthur H. Schlesinger, Dayton, Ohio, assignors to Monsanto Chemical Co. A method for the destruction of plants which comprises applying to said plants a toxic quantity of a herbicidal composition containing as the active ingredient a compound selected from the class consisting of benzothiazole, 2-chlorobenzothiazole and 2-bromobenzothiazole, said active ingredient being present in said composition in a quantity which is injurious to said plants.

2,653,866. ALLYL FURFURYLIDENECYANOACETATE HERBICIDE. Patent issued September 29, to David T. Mowry and Arthur H. Schlesinger, assignors to



He can't stand that slow mixing cycle!



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CORRODED DISCHARGE CHUTE—the Worthington discharge chute is out of the mixer during mixing time. Proper balance makes manual control of chute easy. Pneumatic controls are also available.

HARMFUL DUST SPREADING—the Worthington fertilizer mixer's charging and discharging chutes are designed for dustproof operation. A sealing disc attached to the discharge chute revolves with the drum to assure dustproof mixing.

HEAVY HORSEPOWER CONSUMPTION — Worthington's specially engineered anti-friction construction assures peak operating efficiency with lowest possible horsepower consumption.

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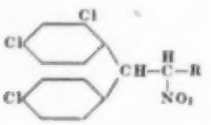
Monsanto Chemical Co. A herbicidal composition comprising a carrier and allyl furfurylidenecyanoacetate as the active ingredient, said allyl furfurylidenecyanoacetate being present in said composition in a phytotoxic concentration.

2,653,896. INSECTICIDAL COMPOUNDS. Patent issued September 29, to Edward B. Hodge, Terre Haute, Ind., assignor to Commercial Solvents Corp. An insecticidal composition comprising from about 0.012% to about 5.0% of a compound of the general formula:



wherein R is an alkyl radical selected from the group CH_3 and C_2H_5 and a carrier therefor.

TRADE MARK APPLICATIONS

P. C. & C. Co., with each letter within a five-sided figure and the whole enclosed in a circle, for insecticides, fungicides, germicides, herbicides, rodenticides and disinfectants. Filed Apr. 15, 1953, by Pittsburgh Coke & Chemical Co., Pittsburgh. Claims use since Mar. 18, 1946.

RYANICIDE, in capital letters, for use in agricultural field for control of crop and field pests. Filed Mar. 30, 1953, by S. B. Penick & Co., New York. Claims use since Feb. 3, 1949.

FIGURE, roughly similar to six-pointed star, for insecticides. Filed May 19, 1952, by Koppers Co., Inc., Pittsburgh, Pa. Claims use since Apr. 29, 1952.

ALLEXCEL, in capital letters, for allethrin-synergist combination for use as insecticides against agricultural and other pests. Filed Mar. 30, 1953, by S. B. Penick & Co., New York. Claims use since about May 16, 1950.

PENDANE, in capital letters, for insecticidal formulations containing purified gamma isomer of BHC for agricultural and other pests. Filed Mar. 30, 1953, by S. B. Penick & Co., New York. Claims use since about Apr. 8, 1950.

RED RIBBON, in caps and lower case, set on an angle. For mineral body of porous, cellular, finely-divided, inert, sponge-like material for conditioning soil. Filed Mar. 4, 1953, by American Bildrok Co., Chicago, Ill. Claims use since Jan. 9, 1953.

FLOTAL, in lower case script (hand-lettered) for soil conditioner. Filed Feb. 4, 1953, by Rumianca, S.P.A., Turin, Italy. Claims use since Apr. 20, 1949.

WEEDABOMB, with central letter "A" oversize and remainder in capital letters. For concentrate liquid chemical used in a solution as a spray on weeds for the purpose of destroying said weeds. Filed Apr. 16, 1953, by Thompson Chemical Corp., Los Angeles, Calif. Claims use since Feb. 25, 1953.

OUTLINE FIGURE, with lower third solid black, for ethylene dibromide, grain fumigant No. 3; phosphotic acid, and other chemicals. Filed Apr. 15, 1953, by Food Machinery & Chemical Corp., San Jose, Calif. Claims use since Aug. 14, 1951.

PLANT PROTECTION PRODUCT, with these letters forming a circle with letters "P P" inside made to represent two plants. For fungicides, hormones, insecticides, larvacides, ovicides, parasiticides, seed dressings, soil disinfectants, weed killers, pesticide solutions, chemical compositions used for mixing with insecticides and fungicides to act as a diluent and soil disinfectants. Filed Oct. 19, 1951 by Plant Protection, Ltd., Yalding, Kent, England. Claims use since 1945 in Great Britain and since January, 1950, in commerce between Great Britain and the U. S.

FOURIUM, in capital letters, for fertilizer. Filed Apr. 17, 1953, by Monsanao Chemical Co., St. Louis, Mo. Claims use since Apr. 14, 1953.

FORIUM, for fertilizer. Filed Apr. 17, 1953, by Monsanto Chemical Co., St. Louis, Mo. Claims use since Apr. 14, 1953.

ORTHO, in bold face capital letters, for compounds used as soil amendments and soil correctives. Filed Dec. 2, 1952, by California Spray-Chemical Corp., Richmond, Calif. Claims use since Sept. 1, 1952.

PORT BRAND, in capital letters, bent in semi-circle, for fertilizers. Filed Mar. 5, 1953, by Port Fertilizer & Chemical Co., Los Fresnos, Tex. Claims use since August, 1941.

•

Wisconsin Meeting Planned

Announcement of the eighth annual Insect Control Conference With Industry has been made by E. H. Fisher, associate professor of Entomology, University of Wisconsin. The meeting is set for January 13 and 14, in the Loraine Hotel, Madison, Wisc.

The committee in charge comprises Mr. Fisher, chairman and T. C. Allen, J. W. Apple and D. A. Dever.

•

Bemis to Build on Coast

The award of a contract for a new manufacturing plant to be erected in Wilmington, California, has been announced by Bemis Bro. Bag Company, St. Louis. Successful bidder was the Guy F. Atkinson Co., general contractor, of Long Beach.

The new plant will be one story, of concrete tilt-wall construction, with office space, factory and storage areas. Production will be multiwall paper shipping sacks.

The move from the present Bemis plant location at Wilmington will improve facilities and provide for a small expansion of capacity. Over 100,000 square feet of floor space will be provided by the new building, the company states.

•

Ohio Group Meets in December

The Ohio Pesticide Institute will hold its seventh annual meeting in the Seneca Hotel, Columbus, Ohio, December 3 and 4, according to Dr. J. D. Wilson, Ohio Agricultural Experiment Sta., Wooster, O.P.I. secretary.

Details of the meeting were not announced, but in past years the event has drawn a large crowd not only from Ohio but from surrounding states. H. E. Bruner is president, Samuel Jeffery, first vice-president, and D. L. Kent, second vice-president.

•

Bulletin Describes Dispersants

Bulletin No. 120, issued by Marathon Corporation's Chemical Division, Rothschild, Wisconsin, describes the function and uses of a group of anionic dispersants, the "Marasperses."

As explained in the bulletin, the "Marasperses" can be used to prevent or retard the settling of finely divided solids in water suspensions; to decrease the viscosity of a system while maintaining the same solids content; and to permit increased concentration of solids in suspension without a consequent rise in viscosity.

•

Attapulgus Pesticide Study

In connection with its own role in the development of granular attapulgite for soil pesticide formulations, Attapulgus Minerals & Chemicals Corp. has prepared a study covering aspects of this promising new field.

The report discusses properties of the company's granular carriers. Copies may be obtained by writing the company, Dept. P., 210 W. Washington Square, Phila. 5, Pa.

DARVAN DISPERSES WETTABLE CONCENTRATES FASTER, MORE EFFECTIVELY

NEW BULLETIN No. D13, just off the press, explains why DARVAN* is an excellent dispersing and suspending agent for agricultural wettable concentrates.

Very small amounts of DARVAN maintain finely divided solids or liquids dispersed in water over long periods of time. Settling out and loss of concentrates as sludge is held to an absolute minimum.

DARVAN breaks up agglomerations and flocs to their ultimate particle size. Toxicants are effective, react quicker because of the greatly increased surface area of smaller sized suspended particles.

DARVAN is soluble in water, with a neutral pH, and stable toward mild acids and alkalis.

Tests indicate that very small amounts of DARVAN actually increased the effectiveness of the toxicant in wettable concentrates. Field tests showed greater crop yields when DARVAN was added to the active agent and carrier than when the same agent and carrier were used without DARVAN. The addition of DARVAN with a wetting agent also increased the yield, while addition of a wetting agent without DARVAN decreased the yield.

Send today for the new technical bulletin No. D13. It describes both grades of DARVAN and explains how DARVAN can increase the effectiveness of your wettable concentrates.

**DARVAN is a dispersing agent, not a wetting agent. DARVAN does not appreciably affect surface tension.*

R. T. VANDERBILT CO.

SPECIALTIES DEPARTMENT

230 PARK AVENUE **NEW YORK 17, N. Y.**

☐ Please send bulletin No. D13.

☐ Please send sample of DARVAN.

NAME _____

POSITION _____

(Please attach to, or write on, your company letterhead)

New Agricultural Equipment

John W. Williamson & Sons, Inc. of Montebelle Calif., announced recently the production of a new line of heavy-duty precision-grinding, mixing, packaging and handling machinery for use in the agricultural chemical industry. Equipment produced and distributed under the program is expected to have wide application in the general chemical, food, and drug industries also.

G. Williamson announced that the new machinery will handle dry bulk materials ranging from insecticides and fertilizers through detergents, cleaning compounds, crushed gravel and other materials. He said the new equipment will include also crushing and grinding machinery for the shredding and pulverizing of products used in the chemical, mineral, food and drug industries; Roberts mills for hay and grain industries; ribbon, drum, paddle and screw-type mixers for general application.

Elevators, conveyors, fans and blowers, cyclones and valves for bulk materials handling; automatic batching equipment for batch or continuous weighing operations, and electronic scales systems. Bag packers for valve bags, open mouth bags or drums in the packaging equipment line; bulk storage equipment, including standard bins, hoppers and building units.

FERTILIZER OFFICIALS

(*Continued from Page* 37)

begun the consideration of this assignment, he reported.

Paul T. Truitt, president, The American Plant Food Council, Inc., Washington, D. C. discussed the question of whether the farm price decline will continue to affect fertilizer sales throughout the country. Despite this downward trend, he said there are a number of factors on the positive side which lend a little light to the overall gloom. One of these factors, he pointed out, is the degree of farm price stability now in existance. This tendency towards stability he said, is very likely to continue. Another plus factor he said, is the continual increase in population of the United States. With this trend continuing there will be less and less problems of food surpluses in the years to come.

PAUL T. TRUITT

At present, however, food surpluses are a factor on the debit side. Another minus quantity is the drop in the value of farm exports and added to this is the problem of what to do with twenty-four to twenty-five million acres taken out of production through government allocation policies.

So far as the fertilizer industry is concerned, Mr. Truitt said, production is moving ahead to the goals set for 1955. He pointed out that fertilizer production has been on the increase for the past fourteen years and indications are that the peak will not be reached until 1955 or 1956.

The APFC head told the control officials that industry appreciates their over all helpfulness in working out mutual problems and stated that at the present time, at least, there is no federal legislation likely to be passed that would affect state fertilizer laws.

Reiterating a point made by Dr. Yeats previously, Mr. Truitt said that statistics are needed badly by the industry. He suggested a semi-annual report from the states and publication without too much delay after such reports are made. "The industry" he said, "always needs these statistics before they appear."

With larger fertilizer volume in the offing, Mr. Truitt suggested that larger staffs for sampling will be needed in many parts of the country.

Dr. Russell Coleman, president, The National Fertilizer Association, Washington, D. C., discussed the question before the group of whether relationships between farm income and fertilizer sales will continue to dominate the sales picture in future years. The NFA president illustrated his talk with charts projected on the screen to indicate the close parallel in past years between farm income and fertilizer sales and production. In years of peak farm income, fertilizer sales tended to go up accordingly. When income went down, so did fertilizer sales.

Dr. Coleman pointed out how efforts are being made at the present time to widen the gap between these two influences.

One chart indicated that farmers today are spending a smaller percentage of their total income for fertilizer than they did during the depression some years back. He urged the necessity of pointing out to the farmer the dollar and cents gain he can make through the wise use of fertilizer materials particularly now when it is necessary to get greater yield from fewer acres. Through this means, Dr. Coleman said, the farmer can improve his economic position and greatly reduce the hazards of declining farm prices and acreage allotments.

Some of the problems faced by fertilizer control officials were discussed by Ernest A. Epps, Jr. of Baton Rouge, Louisiana. He reviewed the headaches given to ontrol officials through over enthusiastic and extravagant advertising copy directed to home gardeners in his state. He pointed out that the public has been conditioned to "marvels" through scientific achievement in other fields, so it is not difficult for them to swallow grossly exaggerated advertising claims regarding plant food, soil conditioners, insecticides etc.

E. A. EPPS

With many city people moving to the suburbs and becoming gardening "experts" such people are easy marks for advertising writers who wish to sell them plant-food.

Control officials, he said, should try to do something about this situation. But what? He suggested that counter-propaganda through press releases in the newspapers has been helpful in Louisiana. Though not 100% effective it does tend to

check the power of some of the inaccurate advertising claims.

Minor elements too, pose a problem for the conscientious control official since these elements are necessary only in specific jobs and are not to be used in "shotgun" quantities as they are sold in many cases. Numerous instances of toxicity to plants have occurred through misuse of minor elements in fertilizer materials, Dr. Epps reported. Other problems include that of foliar feeding of plants which he described as being attractive to many people. While it is quite possible to track down the source of misleading advertising, he said, it is very difficult to counteract oral claims which are made regarding all kinds of agricultural chemicals.

Sampling, he said, is still one of the continuing problems of the control official. He expressed doubt, however, that segregation takes place in bagged fertilizer enough to matter to the sampler. He urged manufacturers to check their machinery to be sure that mixed goods are really mixed. This, he said, would tend to reduce the confusion which obtains in many places at the present time regarding segregation of fertilizer materials in the bag.

Dr. Aaron Baxter, agronomist, Coke Oven Ammonia Research Bureau Inc., Columbus, Ohio, addressed the group on "Evaluation of Secondary Elements in Fertilizers". He said that the term "minor elements" is actually a misnomer because these minerals do far more than a "minor" job. He pointed out that with the use of more and more concentrated fertilizers that the inclusion of more trace elements is necessary.

DR. BAXTER

A number of charts were shown wherein significant increases were noted in crops where trace elements had been added to fertilizer mixtures. He also showed a number of graphs where the content of a number of trace elements was indicated as being less and less as the analysis of the fertilizer was greater. The higher the analysis of the fertilizer, the lower was the content of trace elements.

Secondary elements are not being used in all the places where they are needed, he insisted. Their use is not at all keeping pace with the increased application of fertilizer in agriculture. He concluded by urging the industry to prepare itself to supply these elements to the farmer in a manner so that he can use them readily and efficiently.

The foliar application of plant nutrients was discussed by Dr. Jackson B. Hester, soil technologist, of the Department of Agricultural Research, Campbell Soup Company, Riverton, New Jersey. Dr. Hester reviewed some of the information on results obtained by foliar application of plant nutrients, pointing out that in soils with a high pH, elements such as iron, zinc, boron etc. are unavailable to the plant. In these cases, foliar application has been proved quite satisfactory. However, he said that secondary elements in some cases gave very little response particularly with sulphur and calcium.

DR. HESTER

He reminded that a high analysis water soluble material must be used for this purpose since it must go through a fine nozzle in order to be applied. In one experiment, he reported, phosphate-deficient plants received an application of this element by the foliar method and translocated the material to the soil in less than one day. He pointed out the phenomenon which sees the soil and the plant competing with each other for nutrients. Nutrients can leach out of plants into the soil, he pointed out.

Experience with growers was reported by Dr. Hester, who indicated that the tendency with many farmers is to combine foliar application with spray programs in which "everything" is put in the tank and mixed up. He related a number of incidents where this process had succeeded in ruining entire plots of tomatoes through unwise and ill-considered mixtures of chemicals.

A considerable amount of success has been achieved in the spraying of urea on plant leaves. However, plants vary greatly in their ability to use this type of application, he said. Although there are still many difficulties being confronted in this method of applying plant food, the process has a place in modern agriculture. Only limited information is now available but there is great opportunity for extensive research in the future, he said.

Dr. Vincent Sauchelli, director of agricultural research for the Davison Chemical Corporation, Baltimore, Maryland, gave a summarizing report of the present status of surface wetting agents for fertilizer use. Dr. Sauchelli reported results of actual commercial experiments made in the United States, Canada, and by the United States Department of Agriculture.

DR. SAUCHELLI

Results were not always satisfactory, he reported, and in some cases use of wetting agents seemed to help very little, if at all. However, in all cases it was indicated that there is enough promise in the use of these materials to warrant further investigation.

Knowledge is actually limited in this field and Dr. Sauchelli called for the cooperative effort of the industry in finding out all possible about the use of surfactants in fertilizer manufacturing. He said that the fertilizer industry is already giving the material a good trial and more information is certain to be available later on. He warned the industry however, that one single surfactant will never solve all the problems of every manufacturer. It will result in the use, no doubt, of quite a number of different types of material to hurdle all of the difficulties found thus far in experiments.

"These surfactants are on trial and deserve great consideration by the industry," he concluded. (See Pg. 32 for full text of Dr. Sauchelli's talk.)

With Parks Yeats as chairman of the program, the afternoon session included a talk by J. O. Hardesty,

USDA, Beltsville, Maryland. Dr. Hardesty presented a paper which he had prepared with R. M. Magness, also of the USDA, on "Progress in Fertilizer Granulation."

Dr. J. O. Hardesty, Bureau of Plant Industry, U. S. Department of Agriculture, Beltsville, Md., in discussing particle size and composition of particle-size fractions of granular mixed fertilizers, told the control officials that use of granular material is on the increase. Annual production in the U. S. is around a million tons, but may reach 1½ million tons in the coming year, he predicted.

In screen and chemical analyses made on 29 samples of granular products, most were in the 6 to 20-mesh category, with only a small percentage in the 20 to 35-mesh designation.

Distribution of nutrients among the various size fractions was fairly uniform, although nitrogen tended to be more uniformly distributed among the different size fractions than either phosphorus or potash. "The greatest deviation from grade occurred with P_2O_5 and K_2O in the highest analysis N-P-K mixtures," Dr. Hardesty reported. Although care should be taken to avoid effects of segregation during sampling, he said, the care neccessary is probably no greater than that required to obtain samples of non-granular mixtures.

Investigators from a number of states were called upon in the afternoon session to present their reports to the group. These included the following: M. H. Snyder, Charleston, West Virginia; M. P. Etheredge, State College, Mississippi; J. W. Kuzmeski, Amherst, Massachusetts; J. F. Fudge, College Station, Texas; R. W. Ludwick, State College, New Mexico; W. B. Griem, Madison, Wisconsin; J. B. Smith, Kingston, Rhode Island; R. C. Berry, Richmond, Virginia; Gordon Hart, Tallahassee, Florida.

E. W. Constable, Raleigh, North Carolina; John L. Monaghan, Topeka, Kansas; Parks A. Yeats, Oklahoma City; F. W. Quackenbush, Lafayette, Indiana; A. H. Harris, Raleigh, North Carolina; E. A. Epps, Jr., Baton Rouge, Louisiana; M. B. Rowe, Richmond, Virginia; H. J. Fisher, New Haven, Connecticut; S. B. Randall, New Brunswick, New Jersey; and Allen B. Lemmon, Sacramento, California.

Dr. Lemmon's talk discussed briefly, the subject of pesticides in fertilizers. He pointed out that although from the grower's standpoint, application of mixtures of the two materials appears to be an economical way of saving labor, there are many problems that are still unsolved. From the standpoint of the fertilizer manufacturer he pointed out that in general, they cannot use the same mixing equipment for fertilizer pesticide mixtures that is used for a regular commercial fertilizer mixture. "In other words, it is necessary to design new plants especially for the operation taking into account the difficulty of securing uniform mixtures and special safety features that may be necessary."

Although storage problems result from making a multiplicity of grades using pesticides in them, in parts of California, the fertilizer industry is now trucking materials directly from mixing plants to the farmer's field. Under these conditions, no delay is experienced in handling and it is possible, said Dr. Lemmon, that under such conditions of use pesticides may become more practical than where bagging and storage is involved.

There are other problems too, according to Dr. Lemmon. The problem of compatibility and deterioration needs to be studied for each individual mixture if the materials are to be stored any length of time, he pointed out. Also, the fertilizer manufacturer has no assurance that the rapid progress of the agricultural chemicals industry will not render obsolete any supplies carried over to a new year.

Liability on the fertilizer manufacturer's part is greatly increased when he handles a mixture of fertilizer and pesticides. The California State Chemist reminded that many of our laws, decisions and procedures regarding pesticidal materials consider them separately from fertilizer materials. Fertilizer manufacturers that are not already engaged in the pesticide business would do well to investigate this phase of the problem, he said.

Dr. Lemmon recommended that all economic poisons and fertilizer control officials should discuss personally the problems involved in preparing and manufacturing fertilizer pesticide mixtures before issuing a license to a firm to engage in this business. "The labeling requirements are different and more comprehensive for pesticides than for fertilizers," he reminded. "Such mixtures should be registered and labeled to meet the requirements of both state and fertilizer laws and state economic poisons laws. Any shipment in interstate commerce also requires registration under the Federal insecticide, fungicide and rodenticide act."

EC. POISONS OFFICIALS

(*Continued from Page 37*)

a joint committee on pesticide fertilizer mixers which will operate between the control officials and representatives of the manufacturing industry. He expressed the hope that this arrangement will be helpful in bringing about further understanding both of the problems involved and also of solutions to many of these problems.

That there is no dearth of puzzling problems ahead was emphasized by the AEPCO president. He pointed out that with the increase of small package volume going to the garden trade, the work of control officials is not only complicated but also increased correspondingly in volume. He mentioned also the fact that many large and reliable companies are in this type of business, making the job easier for economic poisons control officials in many states.

Dr. K. Starr Chester, supervisor of the Battelle Memorial Institute, Columbus, Ohio, presented a paper "Looking Forward in Pesticide Research and Control". He said that the advancements of the past twenty years would have seemed impossible looking at it from the viewpoint of 1933. The development of DDT and its successors among the chlorinated hydrocarbon insecticides, the systemic

organic phosphorous insecticides, the whole field of plant growth regulators, the organic fungicides developed of late, the anti-coagulant rodenticides and the new anti-biotics were included among the items specifically pointed out by Dr. Chester.

During that two-decade period, he said, the production of new agricultural chemicals has risen twelve fold — from 50,000 tons per year to 600,000 tons per year! "There is every indication that this rise will continue indefinitely", he said. With increasing population, it will be necessary in 1975 to increase food production by 25% even to maintain present standards of eating. Since hungry people are easy targets for communism he pointed out that the necessity for our contributing food to other nations appears to be permanent and essential in our efforts towards peace.

A vast new market for agricultural chemicals is in the offing, Dr. Chester contended. This market includes both conventional and unconventional types of materials. The pesticides used now, he said, are far from being satisfactory. The decline in usefulness of DDT as insects acquire resistance to it, was an example sighted by the speaker. "In order to cope with the problem of resistance in insects, we are going to require enough entirely different insecticides to present a rotation cycle of insecticides.

Dr. Chester called attention to the fact that various pests cause losses far greater than the average person realizes. For example he said, "insects and disease cause thirty-five per cent more destruction to our forests than does fire, yet we are spending thirty million dollars a year for forest fire control and only a pittance for the control of forest pests! We are like a police department that doesn't know which crimes are felonies and which are misdemeanors."

He pointed out further that as we come to know the magnitude of losses from pests and diseases we will appreciate the expense for pesticides that is warranted to control them and the use of conventional types of pesticides will climb surely and substantially, he predicted.

In looking ahead to the next twenty years, Dr. Chester pictured this period as one of great opportunity but also one containing many vexatious problems in pesticide development and use. "The problems will be less acute the greater the liaison and understanding between the men of industry and those of the government departments concerned with pesticides." He added that this is a complex problem not to be solved by committees that meet at infrequent intervals. "It is a challenge to the men of government, the men of industry, and the men of agriculture who are served by both."

Dr. Charles L. Smith, representing the legislative committee of the National Agricultural Chemicals Association, addressed the group on, "Perspective in Legislation and Regulation." Dr. Smith is associate director of product development for Ethyl Corp., New York.

DR. CHAS. SMITH

He made a plea that greater cooperation be in effect between industry and control officials so that desirable end results may be obtained and that the industry and public alike, may be protected "from unjust and unsubstantiated complaints."

Since the commodities made by industry and controlled by state officials affect the daily life of all citizens, "it is our obligation to bring to the attention of the public the real facts in the case concerning proper use of pesticidal materials."

Dr. Smith urged the control officials to consider every aspect of the use of chemicals in agriculture before making commitments on legislation. "We, in industry, stand ready and willing to work with you to effect needed controls of maximum value to American Agriculture," he concluded.

Representing the National Better Business Bureau, New York, Van Miller, vice-president of the NBBB, addressed the group on "The Role of the National Better Business Bureau in the Advertising of Pesticides." Mr. Miller prefaced his remarks by saying that the Better Business Bureau has no real authority but can "marshal public opinion." He said in most cases this is effective in situations where questionable advertising is being discussed since most reliable companies wish to maintain their good relations with the public.

VAN MILLER

He called on the industry and control officials for information about what should be said on label and in advertising of various pesticidal products. With such guidance he felt that the Better Business Bureau could offer a more efficient service.

He declared that on the whole, pesticide advertising has been on the conservative side by the overwhelming majority of the industry. Consequently, when the exaggerations appear, they stand out in sharp contrast to the legitimate claims made by reliable companies.

The "Fly by Night" outfits are troublesome, he said, but usually do not hurt the public or other businesses very much.

Another type of advertising which is extremely troublesome to the Better Business Bureau are ads which quote "authorities" on various subjects of scientific nature. These "authorities" then have to be checked with other authorities to determine if the copy is right.

The morning session concluded with a series of committee reports covering many phases of the association activities.

The executive committee reported that it had voted to change the name of the organization to, "Association of Pesticide Control Officials, Inc.," instead of the present name of Association of Economic Poisons Control Officials, Inc.

The meeting ended with an election of officers and a panel discussion.

FERTILIZER LAWS

(*Continued from Page 60*)

treated. Agricultural liming materials are also covered.

Registration Fees: An annual inspection fee of $10 is required for each fertilizing ingredient in a product registered. Formerly, the fee was $8. The fee is payable at the time of registration, registration expiring on December 31 of each year.

Tonnage Reports and Fees: In addition to the increased flat fee, tonnage reports and fees are now required for sales in certain quantities. The fee is 10¢ per ton for fertilizer sold in packages of more than 25 pounds. Tonnage reports are due each January 31 and July 31.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show a guaranteed analysis. The analysis must indicate the minimum percentage of plant food claimed in the following order and form: "Total nitrogen ——— per cent; Available phosphoric acid ——— per cent; Soluble potash ——— per cent." In place of the guarantee for available phosphoric acid, the minimum percentage of total phosphoric acid may be guaranteed for unacidulated mineral phosphatic materials, bone, tankage, dried animal manures, dried sewage sludge and other organic phosphate materials.

The guaranteed analysis for agricultural liming materials must show the minimum percentage for calcium oxide and magnesium oxide.

Washington

A NEW fertilizer law will be effective in Washington on January 1, 1954 (H. 84, approved March 17, 1953).

Scope: The law covers fertilizer materials, mixed fertilizer, commercial fertilizer, specialty fertilizer, agricultural minerals and lime. Fertilizer material is defined as "any substance other than unmanipulated animal or vegetable manures containing not less than 5% of nitrogen, phosphoric acid, or potash, singly or chemically combined, and may contain other plant food elements or compounds." Mixed fertilizers include combinations or mixtures of fertilizer materials designed for use or claimed to have value in promoting plant growth. Mixed fertilizer, fertilizer material and specialty fertilizers are commercial fertilizers. Specialty fertilizers are defined as "any fertilizer distributed primarily for use on non-commercial crops such as gardens, lawns, shrubs, and flowers; and may include fertilizer used for research or experimental purposes."

Registration Fees: The annual registration fee has been increased from $6 to $25 per brand. Registration expires on December 31 of each year.

Tonnage Reports and Fees: Tonnage reports and fees are now required. The rate is 10¢ per ton for fertilizer and agricultural minerals and 2¢ per ton for lime. Sales in packages of 5 pounds or less are exempt. Tonnage reports must be filed by the first of October, January, April and July of each year.

How many pounds are sirloin steak?

☐ 250 lbs. ☐ 150 lbs. ☐ 50 lbs.

The American Meat Institute tells meat packers and housewives how much "eatin' meat" there is in a 1000 pound steer—40 different cuts from a side of beef—how many pounds of hides, hoofs and fats.

"eatin' meat" CIRCULATION

Courtesy American Meat Institute

Experienced space buyers recognize that the entire circulation of a publication isn't necessarily all "eatin' meat" for every advertiser. It's who, where and how that counts, not end figures. Careful study of all available circulation FACTS as related to markets is required to appraise media for its advertising value.

The audited information in A.B.C. reports for business publications includes: A breakdown of subscribers by occupation or kind of business • Location of subscribers by states or provinces • How the circulation was obtained • How much subscribers paid • How much paid circulation • How much unpaid distribution • What percentage of subscribers renew • How many in arrears.

By using audited information from A.B.C. reports as a basis for media decisions, you can most accurately judge media for their value to your business and *know* what you get—how much "eatin' meat"—for your advertising investment. This business publication is a member of the Audit Bureau of Circulations. Ask for a copy of our A.B.C. report and then study it.

AGRICULTURAL CHEMICALS

175 Fifth Ave. New York 10, N. Y.

A.B.C. REPORTS—FACTS AS A BASIC MEASURE OF ADVERTISING VALUE

Labeling Requirements: The labels on commercial fertilizers must show weight, brand, maker and guaranteed analysis. The analysis must state minimum percentages in the following form: "Total nitrogen, N ——— per cent; Available Phosphoric acid, P_2O_5 ——— per cent; Soluble potash, K_2O ——— per cent." The source from which the nitrogen, phosphoric acid and potash are derived must also be shown.

In the case of bonemeal, tankage or other natural organic phosphatic materials sold as such, the guaranteed analysis may be in terms of total phosphoric acid.

The special labeling requirements for agricultural minerals and lime are found in sections 7 and 8 of the law.

Wyoming

AN amendment to the Wyoming fertilizer law brings soil conditioners under the law and makes changes in the fee schedule (H. 98, approved February 19, 1953).

Scope: "Soil amendments" or "soil conditioners" brought under the scope of the law are defined as any "material which improves the physical or chemical soil characteristics and is manufactured and sold for such purposes but which is not added for its plant food content".

Registration Fees: The annual registration fee of $25 per grade remains unchanged.

Tonnage Reports and Fees: In addition to the flat registration fee, tonnage reports and fees are now required. The rate of this fee is 20¢ a ton for shipments made in retail packages of 80 pounds or more; ½¢ for shipments in less than 80-pound packages; and one cent for 10-gallon liquids.

Labeling Requirements: The guaranteed analysis which must be given on the labels of soil conditioners must state the minimum amount by percentage of all active ingredients if purported to induce or increase crop yields or plant growth. If not purported to induce or increase crop yields or plant growth, the statement on the label must read: "Has no plant food value."

EMULSIFIERS

(*Continued from Page 51*)

of emulsion concentrates with most of the oil soluble insecticides and herbicide toxicants now being employed. These are as follows:

"T-H Emulsifier C-I"—Designed principally for use in the emulsification of chloro IPC. The quantity required varies with the stability of the emulsion desired ranging from 5 to 15 percent. "T-H Emulsion C-I" is the most water soluble of the series.

"T-H Emulsifier D-I"—is especially suitable for the preparation of DDT and benzene hexachloride emulsion concentrates. Further, it has been used successfully in making methoxychlor and rhothane emulsions. Generally, it is employed at a level of 3 to 5 percent. This emulsifier is the least water soluble and the most oil soluble of the series.

"T-H Emulsifier M-I"—when used at levels ranging from 2½ to

5 percent will impart good emulsion characteristics to a concentrate containing lindane, dieldrin, aldrin, heptachlor or similar toxicants. This emulsifier is slightly less water soluble than "T-H Emulsifier C-I," but much more water soluble than "T-H Emulsifier D-I."

"T-H Emulsifier W-I"—is recommended for the emulsification of chlordane, toxaphene, parathion and esters of 2,4-D and 2,4,5-T. The amount to be employed varies from 3 to 6 percent depending upon the type of concentrate being prepared. When used with esters of 2,4-D and 2,4,5-T, it not only adequately emulsifies the ester and the solvent normally used as a component of the concentrate, but also enables the product to be diluted with a mixture of oil and water and satisfactorily emulsifies the diluting oil. "T-H Emulsifier W-I" is intermediate in water solubility and slightly less oil soluble than "T-H Emulsifier D-I."

Emulsifiers for special purposes have been developed and T.-H. researchers feel that almost any water insoluble liquid can be emulsified by carefully selected emulsifier components.

FUNCTIONAL EMULSIONS

By H. W. Woudhuysen & Associates

EMULSIONS, as a separate form of distributing matter apparently have not caught the scientist's eye, as much as, for instance, the colloids and pure solutions. Still, as a perfect method to combine two or more respectively insoluble elements in a lasting way, their possibilities are far from being exhausted.

Primitively, the emulsion was intended for its own sake, as in a mayonnaise dressing or a cod liver oil emulsion. Its two components, like oil and water, were all that mattered. And, in the more perfected form of the soluble oils, potential emulsions kept in abeyance, the oil overcame friction, the water overheating.

It was fatal that someone would think of the emulsion, not so much as an aim in itself, a combination of insoluble parts, but as a possible carrier for additional ingredients, for which it seems beautifully

prepared. Together here are the two powerful solvents, or we might say three: water, hydrocarbons and glycerides (where vegetable or animal oils are processed). Countless chemicals are soluble in these three groups of solvents, and can be carried by an emulsion to a pre-selected goal.

It would have been fitting to distinguish such emulsions by an appropriate name, and they could be thought of as "functional" emulsions, because they are capable of carrying a number of active ingredients to some destination, where each of them would perform its specific function. Analogies can be found in nature, where certain liquids—like blood and glandular secretions—combine a large number of distinct components, each acting in its own way at the right destination; or "milk," the mother of all emulsions.

When prepared in the form of concentrates, the chemicals in the solution can be applied in a strictly controlled dosage, simply by multiplying the amount of dilution water. In a mercury emulsion, for instance, the final concentration of the emulsion can be 1:1000, 1:1,000,000 or less, and the molecules of the mercury compound will be evenly distributed, even in the weakest possible dilution. This indicates a way for introduction into the body or the bloodstream of fractions of even the most powerful poisons, if the need might arise. It has been published that, when the particle size of the oil phase is sufficiently reduced, emulsions can be injected without risk, as such physical emulsions, as opposed to mechanically made emulsions, show surprisingly low particle size and uniform distribution. This would point also to systemic possibilities.

Using the oil phase as the solvent, it is evident that the organic compounds of the oil-soluble chemicals can be used as solutes. Such oil solutions, after emulsification, have shown a generally reduced toxicity, and on account of the oil present, better properties of spreading, penetration and residual activity. More research should go into the behavior of such emulsions, where the oil phase carries active elements, to ascertain where and how the emulsion breaks, the facts of film-forming, the distribution in either water or oil phase of the active ingredients, etc. Some of this work has been done in the field of agricultural sprays, where breaking of the emulsion and film-forming have been verified within a short lapse of time, from 1 to 2 hours, after which, of course, no further run-off or re-emulsification could occur. Being at its journey's end, the emulsion form, as a mode of transportation, having lost its purpose, is no longer needed. The choice of the organic acid is extremely important, as it modifies the function of the (alkaline) metal, with which it combines, either to strengthen its activity or at the opposite end, to destroy it.

These considerations do not picture the whole story, because, beside oil and water, other solvents may be used for the purpose of dissolving definite chemicals, insoluble in either

water or oils. Alcohols, another class of solvents, may be part of the functional emulsion concentrates, for their role as mutual solvents or for the purpose of securing the interior weight balance of the end product. Fatty acids and alkalis, and non-ionic emulsifiers, may complete the process, all with special properties of solubility toward different chemicals.

It should, therefore, not be surprising to discover that such complex solvents may show increased rates of solubility toward partly or entirely insoluble materials, and in this way expand substantially the number and the groups of processable elements.

These are the principles behind the work of H. L. Woudhuysen & Assoc. in their still limited application to the solubility and emulsification of the organic compounds of the heavy metals. This research opened the way to a more extensive use of the properties of the metals, single or in combination, both for plant disease control and nutrition (minor elements), with which oil soluble or solvent soluble insecticides could be easily combined. However, in this field of application, much more so than in medical uses, the price factor is determinant. The outlook is best for insecticides of a high potency, of which a reduced amount would be effective in the emulsion. A lindane/mercury concentrate might serve as an example.

Restricting the expansion of functional emulsions might arise from their limited quantitative absorption of active elements, as a major part of the total formulation is taken up by the oil carrier, the emulsifiers and additional stabilizers, while for reasons of economy effective final concentrations must be low. As examples, it has been possible to formulate a 30% copper resinate, a 20% copper salicylate, a 10% phenyl mercury salicylate, a 5% lindane/5% organic mercury, a 5% organic cadmium/5% organic mercury concentrate, which indicate the scope of actual concentrations.

Within these limitations—and they are not entirely final—there is certainly a wide field for expansion of the functional emulsions, preferably formulated as emulsion concentrates, not only in agricultural chemical control, but in many other techniques. And a wide field also for further scientific and technological investigation

LIGNOSULFONATES AS EMULSION STABILIZERS

By Marathon Corporation

IN an extensive testing program completed recently by Marathon Corporation's Central Research Department, it was demonstrated that the refined lignosulfonates manufactured by this company are effective stabilizers for oil-in-water emulsions.

These lignosulfonates, tradenamed "Marasperses," do not function as do conventional emulsifiers by lowering interfacial tensions, with consequent "spontaneous" emulsification. Instead, they stabilize O/W emulsions formed mechanically in suitable equipment, such as a colloid mill or homogenizer, by preventing the coalescence of suspended oil

globules. More specifically, this stabilization of emulsions is accomplished by the adsorption of the "Marasperse" at the oil-water interface: (1) establishing electrokinetic charge; (2) establishing a semi-rigid film.

Four types of "Marasperse" are now offered for the stabilization of emulsions. Their characteristics are summarized in the table on the opposite page.

No particular problems are posed in preparing "Marasperse"-stabilized emulsions. The "Marasperses" are completely soluble in water (except Marasperse CE) and all are insoluble in most organic liquids. It is preferable, though not essential, to add the oil phase as a slow, uniform stream to a solution of "Marasperse" passing through a homogenizer. However, the oil and water may be mixed, "Marasperse" powder added, and the entire mixture emulsified as the last step; or a solution of "Marasperse" may be added to the oil, mixed mechanically to produce a stable O/W emulsion. In some cases, with oils that are difficult to emulsify, emulsification is facilitated by heating. Emulsions of low melting solids may be prepared by melting the solid and emulsifying while in the molten condition.

The amount of "Marasperse" necessary to stabilize a specific emulsion will depend, of course, upon the type of oil and its concentration in the emulsion. "Marasperse" required may range from 0.5 to 10.0 percent in the water phase, with oil concentrations up to 75 percent by weight being possible.

The use of soaps or other conventional emulsifiers in conjunction with the "Marasperses" to stabilize emulsions cannot be recommended. Often these agents nullify the advantages gained by stabilization with "Marasperse." If interfacial tension lowering is desired in a "Marasperse"-stabilized emulsion, this effect can be achieved through the addition of inorganic electrolytes and sodium hydroxide to the system.

O/W emulsions stabilized by "Marasperses" are resistant to breaking often caused by extreme pH var-

iation, freezing, heating, mechanical handling, dilution, ageing, and electrolytic contamination. Emulsions prepared with "Marasperse CE" can even be made stable in the presence of the 30 percent chloride.

	Marasperse C	Marasperse CB	Marasperse CE	Marasperse N
Cation	Calcium	Sodium	Sodium	Sodium
Color	Brown	Dark Brown	Brown	Brown
pH (3% solution)	7.0-8.0	8.5-9.0	11.0-12.0	7.0-7.5
Moisture (%)	7.0 max.	7.0 max.	7.0 max.	6.0 max.
Bulk Density (lbs./cu.ft)	35-40	35-40	38-40	35-40
Solubility in H_2O (%)	100	100	80	100
Solubility in oils and most organic solvents (%)	0	0	0	0

Because of their many unique qualities, emulsions stabilized by the "Marasperses" are not readily demulsified by the usual techniques. The most effective manner in which to break these emulsions is to add a small amount of a cationic surface-active agent. Quaternary ammonium compounds, for example, are particularly useful for this purpose.

A NEW LOOK AT EMULSIFIERS

By Nopco Chemical Co.

NOPCO Chemical Company has just completed a study of emulsifiers for use in agricultural spray concentrates and is now preparing to offer the results of this work in the form of a kit of selected emulsifiers.

It has become quite apparent in the field that there is no universal emulsifier for all toxicants. Like suits, emulsifiers have to be well "tailored." They must "fit" the materials they are to emulsify, in order to yield satisfactory concentrates. But, first as one suit may fit more than one individual, an emulsifier may work equally well for more than one toxicant.

Taking into account the number of toxicants available today to the agricultural chemical industry, Nopco Chemical Company has succeeded in developing a small kit of selected emulsifiers. The purpose of this kit is to reduce the number of emulsifiers that a formulator must carry in his inventory without reducing his capacity to produce effective spray concentrates.

It is believed that this idea has been achieved, and very shortly, the results will be offered to the industry.

The "Agrimuls" (Nopco's emulsifier for agriculture) contained in the kit have been completely redesigned and tested to meet the conditions presented by the large number of solvents and waters of varying hardness encountered in agricultural emulsion formulation work. This will permit the formulator to produce concentrates that will be accepted over wider areas than heretofore.

Short Short Course at N. J.

Rutgers University's College of Agriculture was to sponsor a grassland conference Nov. 10 and 11, expected to be a "short short course" on the practical aspects of grassland farming.

Dr. M. A. Sprague, associate professor of farm crops, in announcing the conference, said, that a balanced picture of livestock forage needs, forage production practices and soil resources and management involved in producing livestock with maximum efficiency, was to be presented.

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Coast Garden Supply Show

"Preventive Medicines" and "Chemical Tools," modern gardening aids such as chemical weed killers, soil conditioners, insecticides, growth inhibitors, and antibiotics used to prevent and control plant diseases were featured at the West Coast Trade Show of garden supply manufacturers held at Municipal Auditorium October 27-29. The 1953 Long Beach event is the seventh national show to be sponsored by the Garden Supply "Merchandiser" magazine. Similar exhibits are scheduled for Chicago in January, and New York in February 1954.

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Smith Douglass Earnings

New high records in sales and earnings were established by Smith-Douglass Co., Inc., manufacturers of chemical fertilizers for the fiscal year ended July 31, 1953, according to the annual report to shareholders.

Consolidated net sales for 1953 were $37,160,524, an increase of 23 per cent over sales of $30,211,177 for 1952. The 1953 earnings are equal to $2.26 per share.

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Shell Promotes Humphreys

Cecil W. Humphreys was recently appointed vice president in charge of manufacturing for the Shell Chemical Corp., according to an announcement by R. C. McCurdy, president. Humphreys previously was general manager, and manager of development of the company's manufacturing department.

SMALL PACKAGES

(Continued from Page 43)

that adequate literature must go with each package, worded so that the layman can understand it. The necessity for directions on each package is of course obvious, and again these must be in non-technical language, worded so that the average home-owner can understand, and so that there will be the minimum chance for misunderstanding and possible incorrect use. A number of firms selling this field employ the idea of distributing charts or calendars, giving detailed directions as to what and when to spray. This gives them an opportunity to recommend the one of their products which is best adapted for the particular application. Separate tables cover vegetables, flowers, fruits, ornamentals, etc., with the recommended material changing for different insect pests and plant diseases.

NEW package ideas have not been particularly numerous in this field. One of the few garden insecticide containers that offers any novelty at all is the combination container-dispenser of the pump-gun type. These are in quite general use, and appeal to the user because when he buys in this type container there is no added expense of a spray gun or duster. Manufacturers of these pump-gun type container-dusters include Harcord Manufacturing Co., Jersey City, N. J., The Canister Co., Phillipsburg, N. J., and R. C. Can Co., St. Louis. All three companies also make a wide variety of other conventional fibre containers for packaging agricultural insecticides, fungicides, fertilizers, soil conditioners, weed killers, seed protectants, etc.

One new product, introduced very recently, employs a novel type package. This is a liquid plant food, with added soil conditioner, sold under the name "Thrive" by U. S. Chemical Products Corp., Columbus, Ohio. It is marketed in an oval-shaped plastic squeeze bottle. The user removes the cap, punctures the blank plug with a pin or needle, and then applies the product by squeezing the plastic container.

Another new package on the market this past season was a plastic flower pot which contained a complete treatment for protecting the home owner's flower garden, with the flower pot itself remaining as a premium and a reminder after the product had served its purpose. However, this item has since been withdrawn from the market, so presumably sales were at least something short of sensational.

While the majority of products in the field are packed in fiber or metal containers, there are lots of paper bags used too. DDT wettable powders and numerous other pesticides of the same type are quite commonly packed in paper bags, — 1, 2, 3, 4, 5 lb. and larger. A new type bag, with a built-in handle, for pack-

aging fertilizers, pesticides, etc., has recently been introduced by Equitable Paper Bag Co., L. I. City, New York. It is available in consumer units up to 15 pounds, in single or double wall construction, with any combination of regular or wet-strength kraft or other special types of paper. It can be overprinted in color.

Fertilizers for the home gardener are quite commonly offered in 5, 10, 25, 50 and 100 lb. sizes. Incidentally one firm selling a substantial volume of fertilizer to this market reports that they have found that "backyard gardeners" much prefer to buy in their new 50 lb. package rather than the old 100 lb. bag

One device which, the manufacturer reports, can help to increase sale of agricultural chemicals substantially, is a sprayer to be attached to the garden hose. Manufactured by the Bradson Co., N. Hollywood, Calif., these sprayers are said by the manufacturer to have increased the use of small packages by three hundred percent in certain test areas which were studied. They are said to be easier to use than conventional sprayer types, thus encouraging more regular spraying

ALL-PURPOSE PRODUCTS

TURNING to the general subject of formulation of home garden pesticides, the need is usually for an all-purpose type formula. It must contain a wide enough variety of toxicants in sufficient concentration to kill most of the pests commonly encountered by the home gardener, for there are few users indeed who will buy a variety of special type insecticides, each for application to control a specific pest. And though the toxicants must be present in sufficient concentration to give dependable control, (for the average home gardener wants to see the bugs drop), there must be no acute hazard from excess dosage, for again the backyard gardener is prone to double or triple recommended treatments on the theory that if a little is good, a lot must be much better. Admittedly this combination of characteristics in the ideal home garden pesticide is a tough one to figure out.

One would think, particularly with all the attention that has been directed toward toxicity hazards over the past few years, that the logical toxicants for use in home garden pesticides would be pyrethrum, rotenone, ryania and similar materials which are essentially non-toxic to humans and warm blooded animals. But, oddly enough, the primarily "safe" insecticides are not as widely used as they might well be. Perhaps, as suggested above, the manufacturer realizes that the home gardener wants to see quick and sure results from his control efforts, and is seldom satisfied with anything less than 100% control. At any rate, the common toxicants in home garden products are DDT, chlordane, lindane, and methoxychlor. Some rotenone is used, but apparently very little pyrethrum or allethrin.

Such highly toxic materials, of course, as the systemics, and parathion, have been kept out of the small package trade, but even here it is probably more as a result of the intelligent determination of the primary producers of these toxicants to keep such materials out of the hands of amateur applicators, rather than to any reluctance on the part of formulators to market such pesticides if the materials were available to them.

Many companies, particularly those which are also active in the commercial growing field, offer formulations for the home gardener which are very similar to those which have proved successful in use by commercial growers. Of course there are variations in dilutions and percentage formulations to correspond with methods of application used by home gardeners. New toxicants must necessarily be carefully evaluated before they can be adopted for home garden use, since undue hazard to the applicator or to plant growth must be avoided even more rigorously in a product that will inevitably get into the hands of many thorough amateurs, completely unaware of the

normal safety principles with which commercial growers might be expected to be familiar.

Among the products which have the widest sale are the standard DDT preparations. DDT is most commonly supplied as a 50% and 75% wettable powder or as a 5% dust. The powder is recommended for use against a wide variety of pests including Japanese beetles, Colorado potatoe beetles, codling moth, gypsy moth, leafhoppers, thrips, lygus bugs, leafrollers, etc. The 5% dust is suggested for use against Japanese beetles, European corn borer, corn ear worm, leaf hoppers, cabbage worm, flea beetle, thrips etc. Chlordane, 5 or 6%, is also used as a dust or a spray, without the addition of other ingredients for control of insects in turf and lawns, as well as on vegetables, flowers, ornamentals, etc.

Methoxychlor is commonly offered as a 50% wettable powder for use on vegetables, fruits, flowers and ornamentals to control a wide variety of pests including asparagus beetles, cabbage worms, cucumber beetles, melon and pickle worms, oriental fruit moth, plum curculio, etc. This product, with its lower toxicity, can obviously be recommended for a much wider field of use, particularly on fruits and table vegetables, where DDT and other more toxic materials may not safely be employed at any time near harvest.

A common combination sold as an insecticide-fungicide is 3% DDT with 7% copper. It is recommended for control of various insect pests and blight on potatoes, tomatoes and certain other vegetables.

More obviously designed for the home gardener are formulations which combine an even wider list of toxicants. Typical is a formula which includes 20% sulfur, 5% DDT, 1% rotenone, 2% other cube resins, 3.5% fermate, 1.5% aramite, with a total of about 35% active ingredients. A variation of the above formula is one which combines plant food with the insecticide, by the addition of 0.9% nitrate nitrogen, 0.3% ammoniacal nitrogen, 5% phosphoric acid, and 3% water soluble potash. Recommended for use on flowers, ornamentals and shade trees to control green aphids, rose slugs, thrips, leaf hoppers, leaf rollers, red spider, etc., and against such plant diseases as bacterial leaf spot, black spot, powdery mildew, etc., it also feeds the fertilizer content through the leaves.

A somewhat similar type formula for a combination insecticide fungicide, but one which substitutes less hazardous toxicants, is the following for a vegetable dust: methoxyclor, 5%, rotenone, 0.75%, other cube resins, 1.2%, and zinc ethylene bisdithiocarbamate, 5%. Here the rotenone provides the preliminary rapid knockdown, the methoxychlor gives residual control with maximum safety, and the "zineb" provides disease protection.

A similar formulation, substituting ferric dimethyl dithiocarbamate (ferbam) as the fungicide, and adding about 25% sulfur, converts the product into a floral dust, recommended for use on a wide variety of flowers for control of common pests.

A fruit spray which has wide distribution and is used on apples, cherries, plums, peaches, etc. as a combination insecticide-fungicide incorporates methoxychlor, approximately 12%, ferbam, 15%, and sulfur, 25%.

Sulfur and rotenone (0.75%) is a popular combination for insecticide-fungicide use. It may be used on flowers, ornamentals and also on certain vegetables where sulfur is permissible. It can be used against Mexican bean beetles, worms and aphis on cabbage and cauliflower, pea aphis, tomato worms and asparagus beetles. Sulfur, DDT, and lindane are also commonly combined to give an insecticide-fungicide for control of chewing insects, sucking insects and fungus diseases on flowers and ornamentals.

An idea which is apparently new and unique in this market is the complete home garden kit which is offered by Al-Kem Laboratories, Yonkers, N. Y. The kit includes quantities of seven different insecti-

cides, — 50% chlordane, 50% DDT, 40% nicotine sulfate, 5.6% rotenone, bordeaux, wettable sulfur and dry lime sulfur.

The various insecticides are all packaged in one box, and a chart with the box gives instructions on what to use for different garden problems, and suggests best time and method for application. Each of the products is measured out for dosage and individually packaged in cellophane. The seven products are all time-tested and proved materials.

The selection includes both insecticides and fungicides, and with each of the selected products chosen because of its ability to do specific jobs in the garden, there is something in the kit for the control of most any common type of garden pest or disease.

Rose Manufacturing Co., Beacon, N. Y., have built up quite a business around three original products designed specifically for use in rose culture, "Tri-Ogen Spray," "Tri-Ogen Dust" and "Tri-Ogen Rose Food." The dust has the following active ingredient composition: DDT, 5%, lindane 0.5%, p-chlorophenyl p-chlorobenzenesulfonate 1%, sulfur 20% and ferbam 3.5%. The spray, which is a combination insecticide, fungicide and stimulant has the following ingredients: No. 1, lead arsenate 11.7%, pine oil 2.5%, ferbam 3.75%; No. 2, rotenone 0.5%, rotenoids 1.30%, pyrethrins 0.35%, p-chlorophenyl p-chlorobenzenesulfonate 2.5%, pine oil 9%, triethanolamine oleate 12%; No. 3, ammoniacal copper complex (copper 0.8%). The fertilizer is a high-organic 5-10-5 mixture. Starting with these original products, the line has been expanded and now includes a spray and a plant food for African violets, animal repellents, weed killers, mole killers, etc. A new product in the planning stage for next season will be an insecticidal aerosol bomb for use on both indoor and outdoor plants. It will be marketed under the name "Kill-Ogen Instant Spray".

The above formulas are reviewed, not with any idea that they represent model formulas to be followed, (as a matter of fact, exact percentage composition has been changed in some of them from the particular products studied) but rather as indicative of the toxicants commonly employed, the general range of dosages needed for effective use and the type materials which may usefully be combined. Any one of the suggestions might serve as a starting point for formulating a satisfactory product, but actual testing of formulations in the field is the only adequate proof of effectiveness. Duplicating what one thinks to be some other manufacturer's formula, and which presumably works because he is selling a lot of the product, can turn out to be quite a mistake, and there is no substitute for actual proof that the formulation on which you choose to build a market will actually do its job effectively and safely in the field.

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Moves Fertilizer Office

Crane Fertilizer Co., Sacramento, California, has announced a new location outside the city. They should be addressed now as follows: Route 3, Box 1295, Sacramento, California.

FERTILIZER OUTLOOK

(*Continued from Page 46*)

high-priced land with high taxes, and therefore, I feel there will be a slight increase in the amount of fertilizer used in central Jersey for the next several years. I also feel that this will be true of the remainder of the state. Even though they have not learned that heavy fertilizing pays off and they also have high priced land and high taxes.

"There may be a slight change towards high analysis materials. 5-10-10 and 8-8-8 are still by far our most popular analyses.

"There is very little granular mixed goods used in our area. I think it is mostly due to extra costs. So long as regular materials are in good mechanical condition and flow well, the average farmer isn't interested in paying a premium for granular materials.

"I feel that most of the farmers will use all the fertilizer they can

afford as they have found that heavy fertilization pays off and that big yields are the only way to make profits with high costs. I feel that a lot of fertilizer companies could do a better job of selling if their salesmen were trained to give more service and up-to-date information on how to get the best yields, and not just be order takers. Here in New Jersey our farmers are becoming very soil testing conscious and are calculating the use of the lime and fertilizer they purchased almost entirely on the results of these tests.

"Here again, I think the salesmen should have a good idea of what soil testing can do and be prepared to go over the soil testing reports with the farmer which in turn would add to better relationship and in most cases greater sales."

FUNGICIDES

(*Continued from Page 107*)

that of eradication. The eradicative property of soluble mercury materials is well known. This suggests the possibility of employing "Puratized Agricultural Spray" in pre-blossom application for *Pyracantha* scab control, thereby possibly avoiding danger of fruit injury.

Control of Fire Blight and Frog-Eye Leaf Spot

FOR the past several years, according to J. W. Heuberger and P. L. Poulos of the Delaware Agricultural Experiment Station, the fire blight and frog-eye leaf spot (black rot) diseases have been increasing in severity on susceptible apple varieties in Delaware. The increase is due to several factors, including environmental conditions favorable for fire blight infection and development, neglect of pruning of dead wood, and the advanced age of many of the trees. Severity has reached a point where control measures must be found or many orchards will be abandoned.

It has been known a long time that occurrence of frog-eye leaf spot is correlated with attack by fire blight, the causal fungus of the former disease (*Physalospora obtusa*) overwintering in the wood killed by fire blight bacterium (*Erwinia amylovora*). Therefore it is logical to assume that control of fire blight would aid markedly in control of frog-eye leaf spot.

Bordeaux mixture, applied during bloom, has long been the standard fungicide spray treatment for the control of fire blight. It is effective in more northern apple areas but has not been extensively adopted in Delaware because of its extreme phytotoxicity to the fruit. A dithiocarbamate fungicide ("Dithane Z-78") applied during bloom reduced blossom and twig infection by approximately 75 percent in Colorado.

During 1952, a fungicide spray test was conducted in Delaware on the Starr variety (susceptible to both fire blight and frog-eye) to determine primarily whether certain fungicide and antibiotic materials would control fire blight. Environmental conditions (six days of continuous rain) during the bloom period were extremely favorable for the development of both fire blight and frog-eye leaf spot and consequently both diseases became epiphytotic. Unfortunately, no fruit data were obtained as there was no set of fruit.

Three ethylene bis dithiocarbamate fungicides and several antibiotics were applied to single-tree plots, replicated four times and randomized. All of these materials were used as solutions or suspensions in water. Spraying was done with a power sprayer, at 500 pounds pressure, using a five-nozzle boom.

The first application was made on April 22 (full pink to early bloom stage). The next day, optimum conditions commenced for infection by the causal organisms of both the fire blight and frog-eye leaf spot diseases (rain fell almost continuously for the period April 23 to 29, inclusive, and totalled 3.33 inches). Subsequent spray applications were made on April 30 (about the end of full bloom), May 7 (late petal fall), May 19 (first cover), and June 4 (late second cover).

Fire blight control data were taken on May 16, 26, 29, June 10 and 23; frog-eye leaf spot control

data were taken on May 9, 16, 26, 29, June 10 and 23. The trees were scored, for each disease, on the basis of 0 (no infection) to 10 (100 percent infection); these indices were then transformed to a percentage figure representing the average infection for the season. At each scoring date, the trees were examined also for indications of phytotoxicity. None was observed.

Complete data on materials, concentrations, and control are presented in Table 4.

The control data in Table 4 show that:

1. The three ethylene bis dithiocarbamate fungicides ("Dithane Z-78," "Manzate," "Parzate") gave significant control of both fire blight and frog-eye leaf spot.
2. The antibiotic thiolutin, at 120 ppm., gave significant control of both diseases; however, it was much less effective than the three ethylene bis dithiocarbamate fungicides against frog-eye leaf spot.
3. The antibiotic streptomycin sulfate, at all three concentrations used — 120, 60, and 30 ppm.— gave significant control of fire blight but was ineffective against frog-eye spot.

As soon as it was observed certain materials were giving control of frog-eye leaf spot, a block of bearing young Lodi trees in the same orchard was sprayed by the grower with "Fermate" (2-100), "Dithane Z-78" (2-100), and "Dithane D-14" plus ferric sulfate (2 qts.-1 lb.-100) to obtain information on possible toxicity of fruit, if any; the antibiotic thiolutin was not available in sufficient quantity for use in this work. Three applications were made: approximately at the late petal fall stage, first cover stage, and second cover stage. Examination of the fruit, at harvest, showed considerable russeting from "Dithane D-14" plus ferric sulfate, some skin roughening from "Fermate," and no injury from "Dithane Z-78."

Summation: Control data, obtained under epiphytotic conditions in Delaware during the 1952 growing season, indicate that two zinc ethylene bis dithiocarbamate fungicides ("Dithane Z-78;" "Parzate") and manganese ethylene bis dithiocarbamate fungicide ("Manzate") are highly effective in the control of both fire blight and frog-eye. Of the antibiotics, thiolutin (at 120 ppm.) gave significant control of both diseases; streptomycin sulfate (at 120, 60, and 30 ppm.) gave significant control of fire blight but failed to control frog-eye; and terramycin and copper rimocidin were ineffective against both diseases.

The data on fire blight control support those obtained by Colorado workers.

SURFACTANTS

(*Continued from Page 34*)

curing rate was not accelerated in mixed fertilizers. The initially softer set in the pile of treated fertilizers did not persist with time, and after a few weeks, the degree of hardness was the same as in untreated lots.

In superphosphate manufacture, none of the surfactants tested increased the initial conversion of P_2O_5 in the den or the evolution of fluorine.

Much more conclusive evidence is needed before surfactants can find a permanent place in fertilizer technology. Up to now, surfactant manufacturers have presented general observations rather than scientifically proven data.

Tennessee

EFFECT of the surfactant on rate of cure and extent of conversion in the acidulation of phosphate rock and other effects was studied with results as follows:

(a) Slight improvement was experienced in the ultimate conversion—about 0.5% P_2O_5 which perhaps was due to more intimate mixing of the acid and rock.' Manufacturers who already are accomplishing good mixing and getting a high rate of conversion will not derive further improvement from surfactants.

If one can achieve a 2% improvement, or say 0.4 unit available P_2O_5 increase from use of surfac-

tant, the cost is justifiable especially in a plant doing a poor mixing or acidulation job.

(b) Effect on physical condition of superphosphate: Some beneficial effect observed but it is difficult to measure precisely the degree of improvement attributable to surfactant. Apparently, the set in the pile was softer and to a degree to be significant.

(c) Effect on the chemistry of ammoniation of superphosphate: No change would be expected in the total amount of ammonia the superphosphate could absorb; however, if the super is in better physical condition, it might permit more efficient dispersion of the ammonia throughout the mass owing to greater porosity or bloat condition, and fewer dense particles. Here also it is difficult to measure precisely so as to support claims and the point should be studied further by strictly scientific methods.

(d) Effect on condition in mixed fertilizers: Confusion reigns because of too many claims being made on behalf of surfactants. The difficulties from plant to plant are many and complex, as for example: different methods of processing and many differences in climatic conditions, water relationships, materials used in compounding. These are a few of the obvious ones. Surfactants may be the means of varying water relationships and in this way affect condition favorably.

Conclusions: Under certain conditions of climate, formulation and processing, some one of the surfactants may be found beneficial. Results reported from many sources are varied, yet enough good has been shown to warrant further investigation both in the manufacture of superphospate and in the formulation of mixed fertilizers.

New York

SEVERAL surfactants were studied in the laboratory and in the plant. Tests were made with wetting agents in two formulations of mixed fertilizers of different moisture content and the effect of wetting agent on the surface tension of ammoniating solutions. Very little beneficial effect was noted from use of surfactants. Perhaps the only significant effect concerned the reduction of surface stickiness of the fertilizer, due, perhaps, to better distribution of moisture throughout the mass. Results from the plant scale tests were very inconclusive. Much more work is necessary before a true evaluation of surfactants can be made.

Research at U.S.D.A.

ONE of the most carefully conducted investigations into the possible utilization of surfactants in superphosphate production was reported by E. J. Fox of the Bureau of Plant Industry, U.S. Department of Agriculture [2] at the formal program of the Fertilizer Division of the American Chemical Society on September 9th, following the industry round table. In these tests it was found that surfactants of the nonionic class which are more stable in acid media than the ionic, gave under the conditions of the tests more favorable results in the acidulation of phosphate rock.

The authors showed that surfactants of the same type having different chemical composition gave correspondingly different results and therefore emphasized that investigators should specify both type and chemical composition when reporting their tests. Another point stressed in the report (which apparently had not been fully realized previously) is that many in the superphosphate industry have been using surfactants in the process without being aware of it: for example, small residual amounts of flotation agents used by rock mixers in preparing double-float concentrate, and the contaminants in spent sulfuric acid from oil refineries.

(2) "The Use of Surface-Active Agents in Phosphate Rock Acidulation" by E. J. Fox, H. E. Batson, Jr.; and A. V. Breen.

The amount of residual surfactant on the phosphate rock or in the spent acid may be relatively small, but there is some evidence that it could have more effect during the manufacturing process. It could be that investigators might not allow for the presence of this residual surfactant in the "control" or check run and thereby vitiate the comparison test with the added surfactant.

The outstanding effect reported in these U.S.D.A. tests was that den superphosphate made with the surfactant was softer and this effect was more pronounced in triple superphosphate than in the ordinary grade. Anionic surfactants generally reduced the porosity of the triple superphosphate mixtures and tended to harden the den product, whereas the nonionic increased porosity and tended to soften the product.

Effects of surfactants are, according to these authors, essentially more physical than chemical: by lowering surface tension of sulfuric acid solution they favor quicker and deeper wetting which will hasten the rate of the first chemical reaction between sulfuric acid and rock; but the wetting agents do not appear to influence the secondary reactions involving phosphoric acid and rock residues which occur in ordinary superphosphate during its first week in the pile.

From these considerations and others, they point out that the accelerated rate attributable to the surfactant may be of benefit only during a peak production period when it is necessary to ship without benefit of a long curing period: after 6 to 8 weeks the extent of conversion under the ordinary rate of drying and cooling in the pile would overtake that of the surfactant-treated product.

General Summary: The round-table discussion brought out the following considerations:

It appears possible that the proper use of surfactants could bring about these improvements:

(a) In superphosphate manufacture:

A more efficient use of acid, permitting a higher percentage of conversion with the same acid to rock ratio in an equal curing time or quicker curing to an equal conversion; a softer and drier superphosphate easier to handle and requiring less blasting or none at all; less adherence to equipment, therefore, less shutting down time for cleaning; the use of higher strength acid which might increase evolution of fluorine.

(b) In mixed fertilizer manufacture:

A more efficient ammoniation, permitting also a higher actual rate of ammoniation, although stoichiometric relationship is not affected; a lessened tendency toward caking or lumping in bagged materials and in storage piles, lower moisture content; and less fouling of equipment.

It is necessary to determine the specific factors which lead to the economic use of surfactants. Since the conditions of manufacture and the formulations vary so extensively, it is almost necessary for suppliers to provide custom-service tailored to each plant.

The manufacture of superphosphate seems to hold out at present the most promising opportunity for the utilization of surfactants. The selection of a surfactant should be made on the basis of results which demonstrated it can produce the desired effects.

The fertilizer manufacturer who plans to use a commercial surfactant should know the extent to which surfactants already occur as contaminants or residues in the raw materials of his fertilizer manufacture: he may not need to apply an additional surfactant to what is already present; an excess may be harmful.

A carefully designed, comprehensive, research program is needed so as to determine how, when and what specific surfactant can be used to produce optimal results. The research could be on a cooperative basis in which surfactant manufacturers, the fertilizer industry and federal and state government research agencies could join to establish and conduct the proposed program. ★★

Classified ADVERTISING

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 175 Fifth Ave., New York 10. Closing date: 25th of preceding month.

Situations Wanted:

AGRONOMIST, SINGLE: Wide field experience with herbicides. Formulated pesticides. Soils, grain and chemical background. Prefers technical service, development or research. Address Box No. 793, c/o **Agricultural Chemicals.**

SALES EXECUTIVE: Twenty years experience in domestic and foreign agricultural and industrial chemicals, insecticide materials, etc., desires sales administrative position with substantial chemical firm. Age 43. Graduate BS Chemistry. Address Box No. 794, c/o **Agricultural Chemicals.**

EXPERIENCED AGRICULTURAL CHEMICALS MANAGER: 16 years diversified experience in sales, research and development, technical service, and production supervision. Chemical and biological education with advanced degree. Good background and knowledge of current advances in insecticides, fungicides, herbicides, and defoliants. Seeks responsible managerial or administrative position — any location. Address Box No. 795, c/o **Agricultural Chemicals.**

ENTOMOLOGIST with wide experience in field of Agricultural Chemicals. Now located on West Coast. Can handle sales or technical problems. Address Box No. 796, c/o **Agricultural Chemicals.**

SOIL CHEMIST: Agronomist, M.S., 32. Research, teaching, and industrial experience. Desire responsible position permitting individual growth. Native S.E. Address Box No. 797, c/o **Agricultural Chemicals.**

FOREIGN SALES AND DEVELOPMENT REPRESENTATIVE: Agronomist with wide experience in soils and agricultural chemicals seeks job as sales and development representative in Spain or any other Latin American countries. Spanish spoken fluently. Will consider offer in foreign export and sales department of agricultural chemical firm. Address Box No. 801, c/o **Agricultural Chemicals.**

Positions Available:

AGRICULTURAL RESEARCH and development organization in animal nutrition has several openings for exceptionally qualified scientists, Ph.D's or equivalent, with general background in animal nutrition and with specialization in the field of Endocrinology, Biochemistry, Agricultural Chemistry, Physiology or Bacteriology. Must be able to assimilate and work in entire animal nutrition field, be a forceful speaker and writer and do some traveling. Location midwest. In reply state interest, education, experience, publications, age, salary, and other pertinent information. Address Box No. 798, c/o **Agricultural Chemicals.**

WEED SPECIALIST: Agronomist preferred. 25-30 years old. For economic research and promotion of herbicides. State salary expected. Address Box 799, c/o **Agricultural Chemicals.**

SELLING AGENTS: Fertilizers, Chemicals. European shippers want well-introduced selling agents in U. S. A. Address Box No. 800, c/o **Agricultural Chemicals.**

AGRICULTURAL CHEMICAL SALESMAN wanted to cover concentrated established territory in East Central state. Good income possibilities. Agricultural degree plus two years field experience or equivalent. Reply in detail. Pittsburgh Plate Glass Co., Moorestown, N. J.

HANNA'S HANDBOOK of Agricultural Chemicals used throughout the world. Descriptions of 517 fertilizers, fumigants, fungicides, weed killers, insecticides, rodenticides and miscellaneous chemical materials used every day on the farm, garden and in the home. Formulations, uses, toxicity and antidotes also given. Price $3.25 per copy—Save 25 cents by sending in this advertisement and $3.00 to Lester W. Hanna, R#1, Box 210, Forest Grove, Oregon. Some of the author's propietary chemical materials are—Sulfenone, H. M. #204, Pygolac, Hexa-terta-tox, Dexatox, Sulfodex, Multitox and Tutox.

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THE 22ND ANNUAL MEETING of the California Mosquito Control Association, Inc., will be held December 2-4 at the Claremont Hotel, Berkeley, Calif., according to G. Edwin Washburn, Turlock, Calif.

Insecticide Mfgr. Dies

Dr. William Johnson, 70, manufacturer of insecticides and recognized expert and lecturer on agricultural sprays and soil conditioners, died recently at his home in Oakland, Calif. He was founder and president since 1927 of Destruxol Corp., Ltd., Pasadena, manufacturers of insecticides.

New Fertilizer Kit

H. D. Campbell Company, Rochelle, Illinois, manufacturers of "Glo-Green Liquid Fertilizer," are now manufacturing a new liquid fertilizer planter attachment kit that will fit all makes of planters. The fertilizer is sprayed on the seeding through a special jet attached inside the planter runner. The kit includes either power take-off or side-mounted and driven off belt pulley, strainers, jets, pressure gauges, and sufficient lengths of hose for any type of installation.

Advantages claimed for this new fertilizer applicator: Ease of use —no sacks to handle — no waste by leaching—no excess minerals to contaminate soil. Sprayed on in liquid form, it goes on in a few hours without having to wait for rain. It aids germination and will give young field crops a boost when needed most. Insecticides and seed treatment may be mixed with fertilizer solution and both applied at the same time.

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Industry Meeting Calendar

November 10-12 — Sixth Annual Pesticide Application Equipment Conference jointly with 15th Annual New York State Insecticide-Fungicide Conference. Bibbins Hall, Ithaca, N. Y.

November 16 & 17 — Eastern Branch, Entomological Society of America, Bellevue-Stratford Hotel, Philadelphia.

November 16-18 — National Fertilizer Association, annual fall meeting, Biltmore Hotel, Atlanta, Ga.

November 16-18—Agricultural Ammonia Institute, Chase Hotel, St. Louis.

November 16-20 — Annual Meetings of American Society of Agronomy and the Soil Science Society of America, Dallas, Texas.

December 2-4 — Twenty-Second annual meeting, California Mosquito Control Assn., Inc., Claremont Hotel, Berkeley, Calif.

December 3 & 4 — Ohio Pesticide Institute, Seventh Annual Meeting, Seneca Hotel, Columbus, Ohio.

December 6-8 — Chemical Specialties Manufacturers' Association, Inc., 40th annual meeting, Mayflower Hotel, Washington, D. C.

December 7 — National Joint Committee on Fertilizer Application, Edgewater Beach Hotel, Chicago, Ill.

December 7-10 — Entomological Society of America, Biltmore Hotel, Los Angeles, Calif.

December 8-10 — National and North Central Weed Control Conferences, Hotel Muehlebach, Kansas City, Mo.

December 16-18 — Seventh Annual Cotton Insect Control Conference, Peabody Hotel, Memphis, Tenn.

January 11-13—Seventh Southern Weed Conference, Hotel Peabody, Memphis.

January 13 and 14 — Eighth Annual Insect Control Conference with Industry, sponsored by University of Wisconsin, Loraine Hotel, Madison, Wisc.

January 14 & 15—Fourth Annual Louisiana Insect Control Conference, Hotel Bentley, Alexandria, La.

January 20-22 — Western Cooperative Spray Project, Imperial Hotel, Portland, Oregon.

January 21-22, 1954 — Illinois Custom Spray Operators' Training School, University of Illinois, Urbana.

January 25-29 — Eighteenth annual Pest Control Operators' Conference, Purdue University, Lafayette, Indiana.

March 24-26 — National Agricultural Chemicals Association Spring Meeting, Shamrock Hotel, Houston, Texas.

Potash Deliveries Up 10%

Deliveries by United States potash producers and importers amounted to 2,445,411 tons of potash salts containing 1,425,351 tons K_2O during the first nine months of 1953, the American Potash Institute, Washington, D. C., has announced.

This marks an increase of 10% in salts and 11% in K_2O over the corresponding period of 1952.

Further data on potash, released by API includes the following:

Potash for agricultural use in the United States, Canada, Cuba, Puerto Rico, and Hawaii amounted to 1,345,752 tons K_2O contained in 2,317,234 tons of salts of which 2,098,853 tons were muriate of potash, 4,711 tons manure salts, and 213,670 tons sulphate of potash and sulphate of potash magnesia. This represents an increase of 9% in salts and an increase of 11% in K_2O. Deliveries to the chemical industry totaled 126,067 tons of muriate of potash and sulphate of potash, containing an equivalent of 78,318 tons K_2O, an increase of 28% in salts and in K_2O over 1952. Exports outside of North America amounted to 2,110 tons of salts, containing an equivalent of 1,281 tons K_2O, a decrease of 62% in salts and 64% in K_2O under the same period in 1952.

The seven major American potash producers delivered 673,823 tons of potash salts containing an equivalent of 396,582 tons K_2O during the third quarter of 1953, an increase of over 1% in salts and nearly 3% in K_2O over the same period in 1952. Agricultural deliveries in the United States, Canada, Cuba, Puerto Rico, and Hawaii amounted to 635,728 tons of salts, equivalent to 372,911 tons K_2O, comprised of 579,374 tons of muriate of potash, 701 tons of manure salts, and 55,653 tons sulphate of potash and sulphate of potash magnesia. The chemical industry took 37,825 tons of muriate of potash and sulphate of potash, containing an equivalent of 23,502 tons K_2O. Exports outside of North America amounted to 270 tons of salts containing 169 tons K_2O.

Index to ADVERTISERS

(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

Tale Ends

VERNON S. Gornto, newly-elected chairman of the Fertilizer Section of the National Safety Council, and one of the industry's most enthusiastic and energetic boosters for the promotion of safety in plants, was unable to be at the recent national meeting in Chicago because of illness. Mr. Gornto, who lives, breathes, talks and dreams of improving safety records both in his own company (Smith-Douglass Co., Norfolk, Va.) and in the plants of other firms, was sorely disappointed in having to miss the meeting.

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Faces in our editorial and proofreading departments are slightly red because of our reporting in the October issue that Dr. George F. Weber was succeeding Dr. George L. McNew as president of the American Phytopathological Society. Actually, Dr. Weber succeeded Dr. James G. Dickson of the University of Wisconsin. Dr. McNew had headed the APS the previous year. We apologize to the gentlemen involved.

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With the acreage allotments for 1954, plus a general decline in agricultural income, fertilizer manufacturers are emphasizing the importance of stepped up sales efforts, as indicated in our survey appearing on page 44 this issue.

Not to miss an opportunity to sell even a small portion of plant food to a new customer, one fertilizer man, in replying to the A. C. questionnaire, told how his firm was grasping every opportunity to make a sale. He concluded his letter with this paragraph, directed to the editor: "Say, do you use lawn fertilizer in the fall? Our 25 lb. bag sells for $1.50, F.O.B. Marysville, Kansas. We can ship today."

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That the new sound-color movie, "Making the Most of a Miracle," produced by the American Plant Food Council, is a success, was seen in the enthusiastic reception it received from more than 100 guests who saw its premier showing in Washington on October 29.

Typical comment came from Henry A. Davis, newly-elected president of the Fertilizer Control Officials:

"This picture will, I believe, be of interest to a wide variety of audiences. I would suggest it to be especially appropriate for all groups of young people . . . not only young farmers, but also for those not especially connected with agriculture.

"This picture vividly shows the elements required in plant food for good crop production. All persons, even remotely concerned with agriculture, should see this film."

(The picture runs 27 minutes, is on 16mm film in color.) Prints may be purchased or borrowed. For details, write Louis H. Wilson, Director of Information, American Plant Food Council, Barr Building, Washington 6, D. C.

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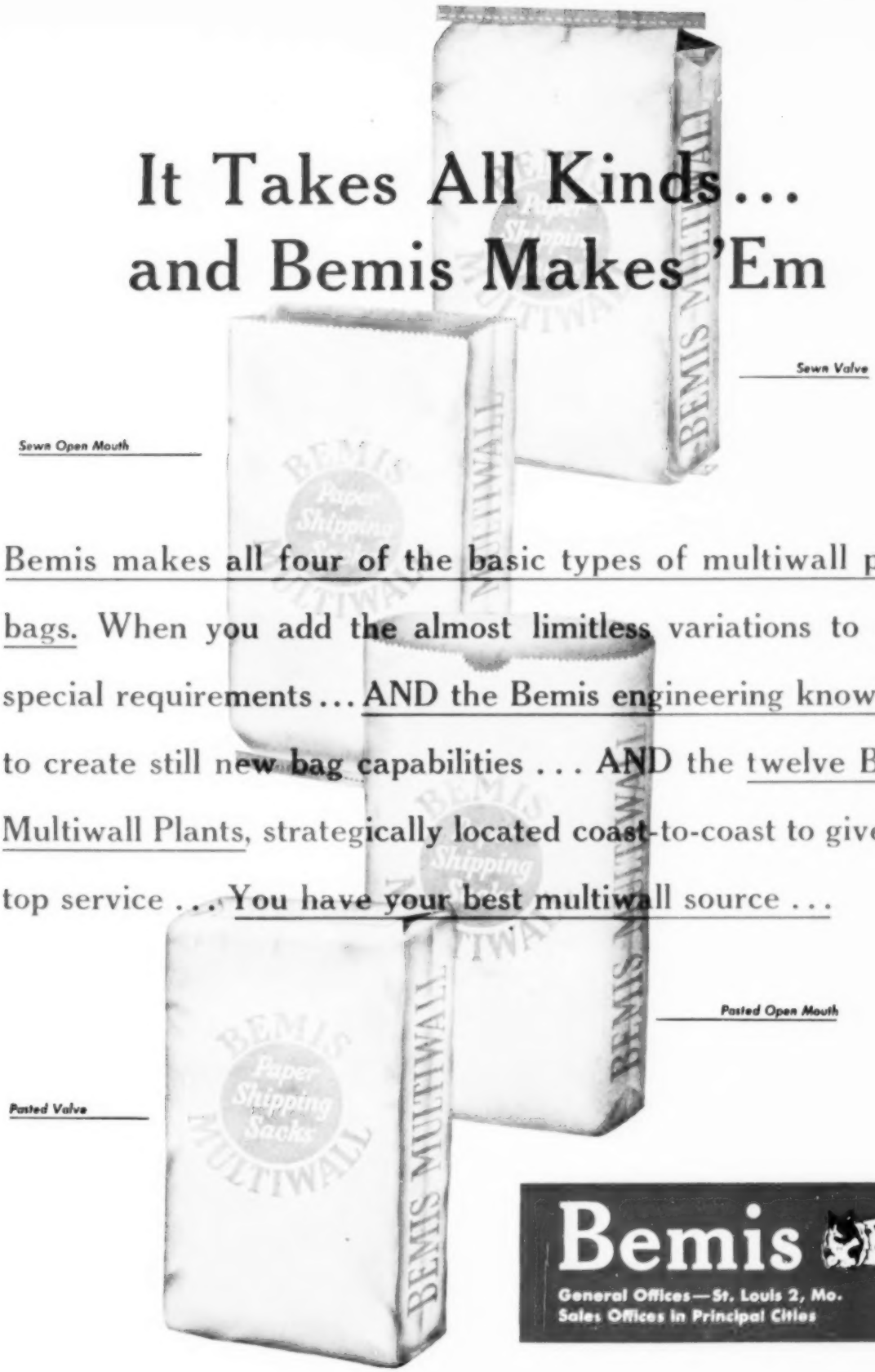

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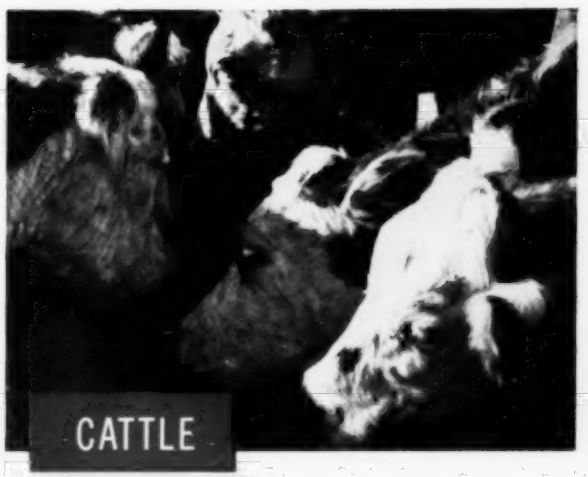

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